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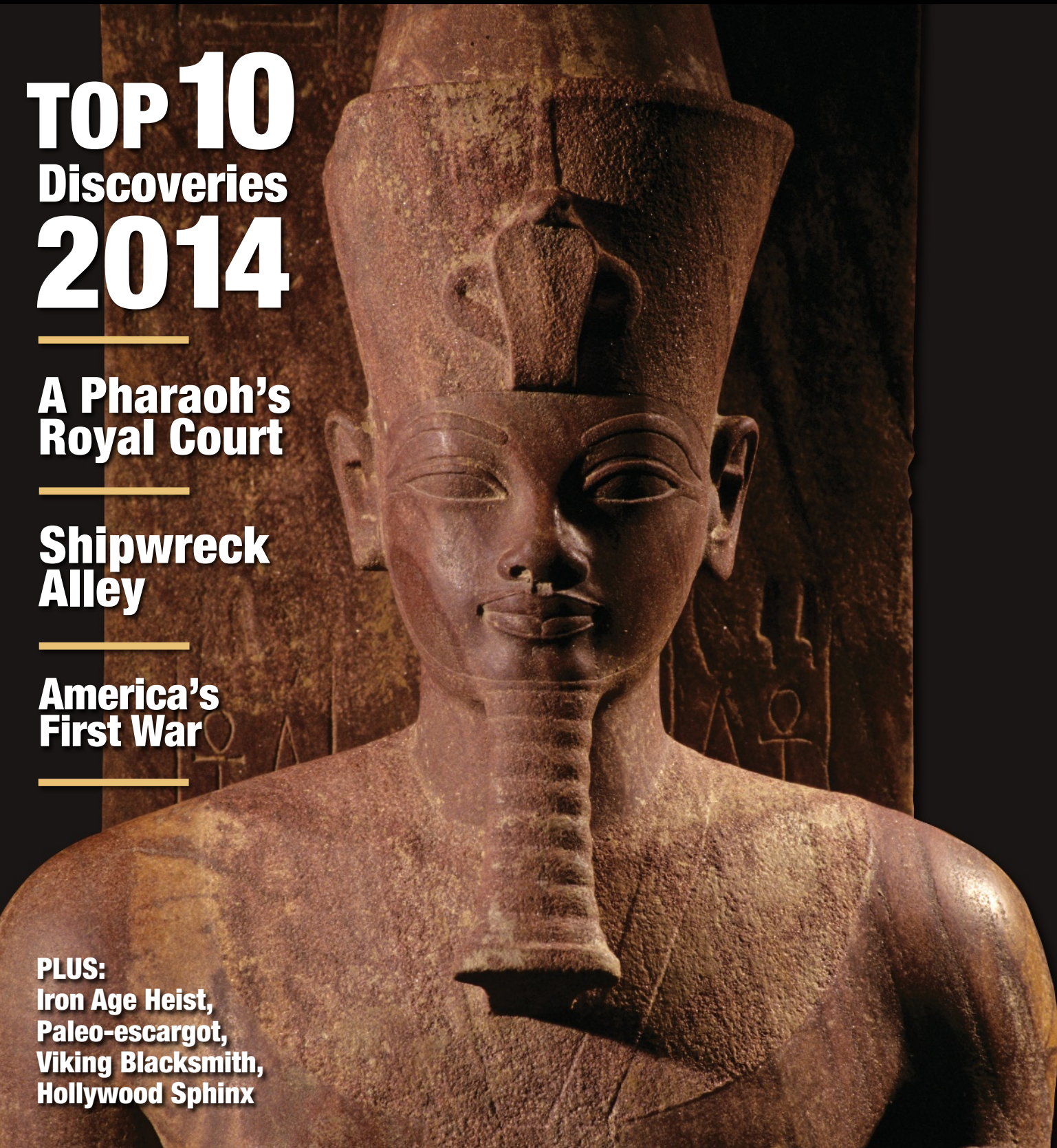
TOP 10 Discoveries 2014

A Pharaoh's
Royal Court

Shipwreck
Alley

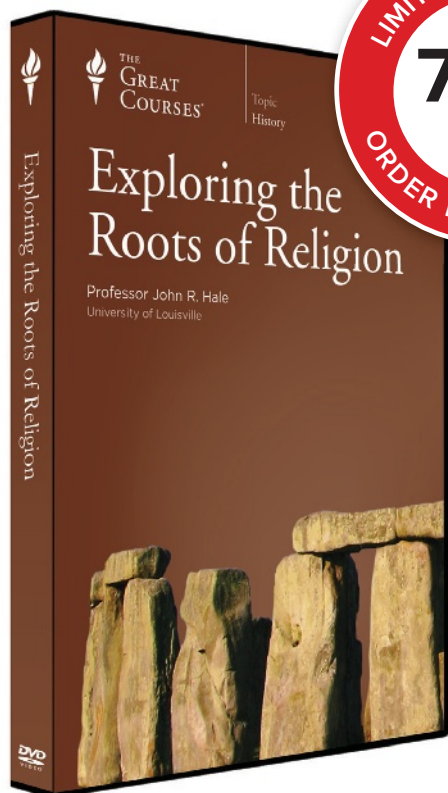
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King Solomon's Secret Treasure: FOUND

Ancient beauty trapped in mines for centuries is finally released and available to the public!

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Searching on Many Fronts

It is again our pleasure to ring in the new year by announcing our roster of "Top 10 Discoveries" (page 24). In 2014, from evidence in the Yucatán of the earliest-known inhabitants of the Americas, to excavations in a Nepalese temple that may help determine when Buddha actually lived, to Amphipolis in Greece, where a monumental fourth-century B.C. tomb has been uncovered, and more, archaeology continued to advance our knowledge of the human past in exciting ways.

Not all great discoveries, however, are recognized the moment they're made. Senior editor Daniel Weiss spoke with archaeologist Susanne Bickel, who is excavating a tomb in Egypt's Valley of the Kings, a burial likely ignored by earlier archaeologists because of its state of disarray. "Beyond the Pharaohs" (page 38) explores what Bickel believes may be the connection between 18th Dynasty pharaoh Amenhotep III and the women and children buried there.



In Mystic, Connecticut, amid houses, fields, and woods, lies evidence of what some call "America's First War" (page 32), a deadly engagement lasting from 1636 to 1638 pitting the Native American Pequot tribe against the English and their Native allies that resulted in the near-total annihilation of the Pequot Indians. Jason Urbanus brings us the story of archaeologists' efforts to document the war and of the involvement of both Mystic residents and descendants of the Pequots.

As the Roman Empire was reaching an end and Christianity was becoming Europe's dominant religion, the Merovingian dynasty came to rule what is modern France. Little, however, is known about them archaeologically. In "Gaul After the Romans" (page 48), executive editor Jarrett A. Lobell writes of a previously undocumented Merovingian cemetery in northern France. Archaeologist Aminte Thomann excavated the graveyard in a mere four months, ahead of the land's development, preserving evidence from its nearly 400 graves and the history they contain.

Lake Huron's Thunder Bay sits in the middle of the Great Lakes waterway system, where navigational hazards and storms have left a trail of shipwrecks. Deputy editor Samir S. Patel visited "Shipwreck Alley" (page 42) and dove with underwater archaeologists who are documenting centuries worth of well-preserved vessels—each a key part of the history of shipping on the lakes and the settlement and industrialization of the American continent.

And, journey to Phnom Kulen in this issue's "Letter From Cambodia" (page 52), by Karen Coates, to discover a site that has deep roots in that nation's past—or travel around the world via "From the Trenches" and "World Roundup."

Claudia Valentino

Claudia Valentino
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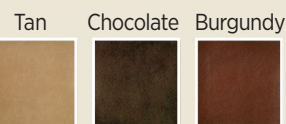
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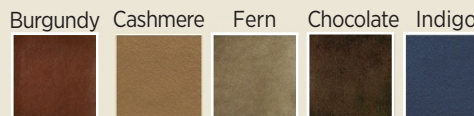
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Turkey's Heritage, at a Crossroads

Standing at the intersection of Asia and Europe, few countries are richer in archaeological and architectural heritage than Turkey. The record of human activity there spans millennia and can be seen in places ranging from the remarkable Neolithic settlement of Çatalhöyük to the great and historically rich mosques of Istanbul. These and other sites across the country document major episodes in the human experience. While on a visit to Istanbul this past autumn to take part in the annual meeting of the European Association of Archaeologists, I was reminded, yet again, of Turkey's cultural significance, and of the impressive steps the Turkish authorities are taking to preserve and display both sites and artifacts for the public.

In Istanbul, many of the most famous sites are undergoing major restoration, including Hagia Sophia, itself an architectural wonder, which first was a church, then a mosque, and now is a museum. Topkapı Palace, once a residence for Ottoman sultans, now, too, is a museum and is undergoing additional renovation. Excavations beneath a metro station in the city have revealed the harbor of Theodosius, one of the major ports of Constantinople,



along with the remains of 37 ships with dates spanning more than 500 years. A number of the artifacts recovered from the harbor can be seen displayed at Istanbul's Archaeological Museum. The still-standing city walls of Theodosius testify to the effectiveness of Byzantine engineering.

All across Turkey, there are renowned UNESCO World Heritage sites that document significant aspects of the country's past. Hattusha, the late Bronze Age capital of the Hittite Empire, with its temples, rock-cut reliefs, and sculptures, is one of the most impressive. The mountaintop sanctuary of Nemrut Dağ, the Hellenistic-era tomb built by Antiochos I for his own use, with its colossal sculptures of humans, divinities, and animals, remains as striking today as it must have been when constructed in the first century B.C.

The Ottoman architect Sinan's masterpiece, the Selimiye Mosque at Edirne, completed in A.D. 1575, is a glory of Islamic architecture. All of these are the focus of continuing preservation efforts. Expanded programs train experts in the conservation of archaeological sites and historic urban landscapes.

Turkey today is home to hundreds of archaeological museums, with 14 new ones having been constructed in recent years, and 21 more nearly completed or in the planning stages. These structures, often futuristic in concept, will put Turkey at the forefront of archaeological heritage presentation worldwide and will ensure that Turkey's deep archaeological past will be available for public study and consideration long into the future.

Andrew Moore

President, Archaeological Institute of America

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Discovery of oldest Maya murals ever found at San Bartolo, Guatemala. Photo by Heather Hurst.

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L-R: Eric Blind with Ellen and Charles S. La Follette in the archaeology lab in San Francisco's Presidio.

For Charles S. La Follette, creating a personal legacy through a planned gift in his will was a natural extension of his involvement with the Archaeological Institute of America and his commitment to archaeological research and education. "I joined the Norton Society to help the AIA continue its wonderful archaeological programs for generations to come," says Charles. With his bequest, he is confident that AIA will continue to provide professional archaeologists with resources critical to their work and lifelong learning opportunities for everyone.

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A Way to Remember

"Dawn of a Thousand Suns" (November/December 2014) brought back memories of a visit to the Nevada Test Site that I made some years ago. In 1988 I was a petroleum geologist working in Nevada. I attended the Geological Society of America convention in Las Vegas that year and took their "Geology of the Nevada Test Site" field trip. After I read your article I dug out all my material from that trip. I still have all the handouts and maps we were given in our one-day tour. We visited Yucca Mountain, the Sedan crater, and Frenchman Flat, and went underground in the G Tunnel. We were not allowed to bring cameras, but I recognize the train trestle and the bank vault in your piece. We had lunch at the Area 12 cafeteria on the test site, we drove on lots of dirt roads, some of which were no more than paths, and we once even got lost. I also remember that we were issued radiation badges upon entering the site that were checked and reclaimed when we left. As we were exiting a dirt road onto an improved one we drove past a sign. I looked back and saw that it read, "Dangerous Radiation Area. Do Not Enter." But apparently no harm was done.

Paul Roales
Tulsa, OK

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Mistaken Identity?

To one familiar with Mexican fauna and/or amphibians, it is clear that the "frog with jaguar-like spots" in the detail from the Mesoamerican fresco on page 34 of the November/December 2014 issue actually represents a toad, probably the cane toad (*Rhinella marina*), because it is the most dramatically huge toad in Mexico. The structure on the back of the head is one of the two venom-producing parotoid glands, typical of true toads, and the supposedly "jaguar-like" spots are actually the "warts" typical of toad skin.

Ronald H. Pine
Lawrence, KS

Spinning a Tale

I read with interest Andrew Lawler's article "Seafaring in Ancient Sri Lanka" (November/December 2014). However, I believe that the archaeologist may have made a mistake in identifying the "small round piece of dark-blue glass with a hole in the middle" as a possible loom weight. From the brief description it sounds like it almost certainly is a spindle whorl. Spindle whorls are the flywheels of drop spindles, which were used for thousands of years prior to the invention of the spinning wheel to spin thread. Loom weights are, by definition, heavy enough to maintain tension on a number of warp threads on a warp-weighted loom. It is improbable that any object described as "small" and of a comparatively low-density material like glass would be used as a loom weight, assuming that warp-weighted looms were in use in that part of the world at that time. In addition, glass

spindle whorls are known from the period of the Sri Lanka wreck. They would probably have been considered luxury goods since spindle whorls may be made from dried mud, wood, ceramics, pottery shards, metal, or glass. A glass spindle whorl could actually be a demonstration of wealth.

George Monsson
Fort Morgan, CO

Buffalo Story

I was surprised at Eric A. Powell's article on the buffalo jump he visited ("Letter from Montana," November/December 2014). The history we learned was that jumps were used as long as 6,000 years ago. In the time before horses, this was a critical method of killing a large, wily, wary animal, and there are thousands, perhaps tens of thousands, of jumps scattered across the northern plains. The drive lines, tepee rings, fire pits, etc., are commonly found at many of these sites.

Maurie Petterson
Sheepdip, MT

Eric A. Powell responds: Communal buffalo hunting in the High Plains does indeed have a long history, going back many thousands of years at places such as the Calderwood jump in Alberta. However, study of earlier buffalo kill sites shows that until around A.D. 600, hunters typically lured a few animals at a time into traps rather than cliff jumps. The classic buffalo jump with extensive cairn-lined driving systems became common in the Late Prehistoric Period, the era covered by the article, when the archaeological record shows evidence for large-scale buffalo drives and meat processing on a near-industrial scale.



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From the Trenches

LATE-BREAKING NEWS AND NOTES FROM THE WORLD OF ARCHAEOLOGY

The Price of Plunder

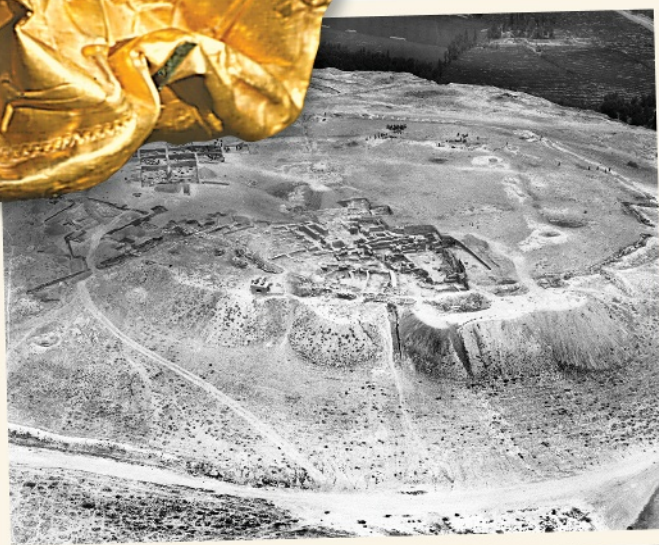
The Iron Age fortified hilltop site of Hasanlu Tepe in northwest Iran was sacked around 800 B.C. Much of the chaos and destruction from that event was long frozen in time, until archaeologists encountered well-preserved buildings, artifacts, and even human remains in their efforts to reconstruct the ill-fated settlement's demise. The site was briefly explored in the 1930s, and large-scale excavation took place there between 1956 and 1977, sponsored by the University of Pennsylvania Museum, the Metropolitan Museum of Art, and the Archaeological Service of Iran. In 1958, the discovery of Hasanlu's most famous find, known as the Gold Bowl, brought the excavation international attention. The solid gold artifact weighs more than two pounds and bears remarkable repoussé and chase decorations (made by hammering the metal from both the back and front) depicting various mythological scenes. The spectacular vessel, however, was surrounded by an air of mystery. The bowl was found crushed beneath a layer of burned debris near three skeletons. How did the valuable object end up there? Were these individuals rescuing it from the burning city? Or were they stealing it?

Michael Danti, a Boston University archaeologist, is taking a new look at the find and its context, and his latest theory suggests a scene more sinister than heroic. The original Hasanlu Project produced massive amounts of data, but the speed, size, and scope of these excavations often resulted in limited documentation and publication of the material.

Decades later, Danti is seeking to remedy this problem by reviewing and publishing the information. The process is providing new details about the site's destruction nearly 2,800 years ago. "Whenever we reexamine a Hasanlu dataset we find something new and exciting," says Danti. "The possibilities for reanalysis are incredible."

Hasanlu developed into a significant commercial and pro-

duction center during the early Iron Age (1400–800 B.C.), owing to its location on important trade and communication routes between Mesopotamia and Anatolia. The citadel at the center of the settlement contained an array of monumental buildings, including palaces, temples, and large multi-columned halls. The evi-





dence Danti is studying confirms that the citadel met with a violent end. Many buildings were ransacked and burned, which caused them to collapse.

"Hasanlu's destruction level makes it a giant ninth-century B.C. crime scene."

According to Danti's analysis of the Gold Bowl's context, the valuable

object was in the process of being looted by enemy combatants. The three soldiers, who, based on their military equipment and personal ornaments, probably hailed from the Urartu region north of Iran in modern Armenia, were in the process of plundering a wealthy, multistory complex as the citadel burned. They located the bowl and other valuables in a second-story storeroom. As they fled with their prize, the mud-brick building suddenly collapsed. The invaders were hurled to the floor below, where they were crushed by debris, and lay buried, side-by-side—thieves and their trophy—for nearly three millennia.

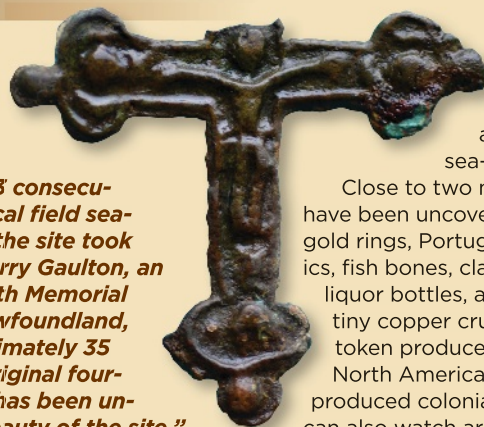
—JASON URBANUS

OFF THE GRID

Many people will be surprised to learn that the best-preserved early English colonial site in the Americas is located on a rocky peninsula in Newfoundland, Canada. Known originally (and still) as Ferryland, the site was visited seasonally by Beothuk Indians and, in the sixteenth century, by fishermen from several European countries. English settlers arrived in the early 1620s, and George Calvert (later Lord Baltimore) christened the colony Avalon, after the legendary island of Arthurian legend. Like the Plymouth Colony, it was an early bastion of religious tolerance in North America. Over the following decades, the colony established itself and grew—with several hundred inhabitants at its peak—but it was looted and burned by French soldiers in 1696. After that, the site was all but aban-

doned, leaving its ruins mostly undisturbed for three centuries.

The first of 23 consecutive archaeological field seasons—so far—at the site took place in 1992. Barry Gaulton, an archaeologist with Memorial University of Newfoundland, says that approximately 35 percent of the original four-acre settlement has been unearthed. "The beauty of the site," he says, "is that it's so well preserved. Because the settlers built in stone, it's all there to see. There's no real imagination required. In terms of visibility, in terms of the settlement, everything is there. Archaeologists just have to slowly uncover it all."



doned, leaving its ruins mostly undisturbed for three centuries. Along the waterfront are a seawall and a sea-flushed privy.

Close to two million artifacts have been uncovered, including gold rings, Portuguese ceramics, fish bones, clay pipes, empty liquor bottles, a recently found tiny copper crucifix, and a lead token produced by Kirke—

North America's earliest locally produced colonial money. Visitors can also watch archaeologists and conservators at work. Many of the artifacts are on view at the interpretation center, which hosts historical demonstrations and has a reproduction of a seventeenth-century garden.

While you're there

The Colony of Avalon site is in the modern town of Ferryland, which has a museum of its own and a regional arts center that hosts a dinner theater, concerts, and cultural festivals. Ferryland is known as the Irish heart of Newfoundland and Labrador, and Irish traditions continue to thrive. Nearby, the Ferryland Lighthouse, built in 1870, is a great location for picnics where the curious can see birds, whales, and icebergs. You can purchase a picnic lunch and borrow a blanket and books from the folks at the lighthouse.

—MALIN GRUNBERG BANYASZ



The site

From June to October, visitors can explore the remains of a variety of private and public structures. The parlor and a portion of the kitchen from the mansion house of Calvert and, later, David Kirke, the first governor of Newfoundland, can be seen. Nearby are the remains of a bakery/brewhouse, cobblestone street, warehouse,



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A Tale of Two Railroads

Archaeologists working with one of the world's newest rail projects have discovered the remains of one of the oldest. Near London's Paddington Station, researchers employed by the Crossrail tunnel project dug up the foundations of engine sheds, workshops, and turntables used to turn trains, built in about 1851 by I.K. Brunel, creator of the Great Western Railway, which linked London to western England. They also found traces of Brunel's stone rail beds, which were among the last to be built at the wide-gauge measurement of seven feet. In 1846, Parliament had decreed that narrower, cheaper, standard-gauge rails would be phased in everywhere in Britain. However, archaeologists found no pieces of the actual iron tracks, barring a few twisted fragments. "Very likely they were all salvaged when the buildings were demolished in 1906, and the iron was recast and reused," says Jay Carver, lead archaeologist for Crossrail. The timber sleepers—also known as ties—were also missing. Other discoveries include the well-preserved floor of a 600-foot-long shed where trains were cleaned and maintained and that, in its day, could hold dozens of locomotives and passenger coaches.

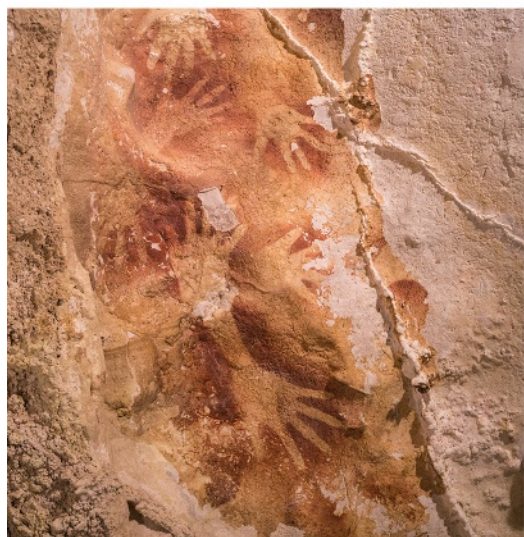
Since no records of the site's dimensions were kept when it was demolished and covered over by a bus depot and a mixing plant, Carver and his team are mapping and pho-



tographing the yard to establish what it looked like in Victorian times, and maybe to reconstruct it. That would be a fitting tribute to Brunel, a legendary civil engineer who is one of the most revered Britons of all time, often ranking second only to Winston Churchill in popular polls. The Great Western Railway, opened in 1838, "was probably Brunel's greatest achievement, and this was one of the most important structures associated with it," says Carver.

—ROGER ATWOOD

On the Origins of Art



Archaeologists have determined that cave art on the Indonesian island of Sulawesi is just as old, if not older, than similar but much more widely known examples in Spain and France. A hand stencil was laid down there at least 39,900 years ago, they report, and a drawing of a piglike animal was sketched at least 35,700 years ago.

The researchers established the minimum age of the designs by dating mineral deposits that have formed on top of them. The deposits contain trace amounts of uranium, which decays at a steady rate to thorium, so their age can be calculated from the ratio of the two elements.

The discovery raises the question of whether human artistic expression was pioneered independently in Western Europe and Southeast Asia, or had evolved in humans before they left Africa. "We really can't say either way, but my gut feeling is that rock art developed in Africa before our ancestors spread out of that continent," says Adam Brumm, an archaeologist at Griffith University in Australia. "Therefore, we would expect to find rock art of a similar age in many other parts of the world."

—DANIEL WEISS



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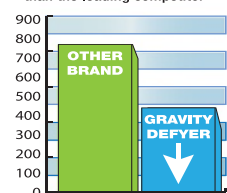
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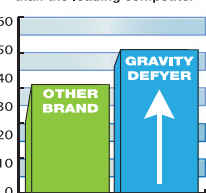
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Fancy Footwear



A team of archaeologists from the Naju National Research Institute of Cultural Heritage in South Korea's South Jeolla Province has uncovered a remarkable pair of shoes in a tomb. The gilt-bronze shoes date to the fifth century A.D. and are the best preserved of only 17 similar pairs found in the country. They are also the most elaborately decorated, with images of lotus flowers and goblin-like creatures covering the surface, and a dragon leaping from each toe. Because they are oversized and not very sturdy, archaeologists believe the shoes weren't for daily wear, but rather for a burial ritual, perhaps reflecting the hope that the dead's spirit would rise to a better place. In addition to the shoes, the team also uncovered gold jewelry, jade, weapons, a harness, and pottery, suggesting that the tomb's occupant was likely one of the rulers of Mahan, a confederacy of statelets that existed beginning in the first century B.C. at the southern end of the peninsula, alongside the more famous Three Kingdoms of Goguryeo, Silla, and Baekje. The shoes, which are Baekje-style, were likely a gift to the Mahan ruler.

—HYUNG-EUN KIM



The King Is Dead. Long Live the King.

The skeleton of Richard III, discovered in 2012, is continuing an active afterlife as it makes its way from the ground beneath a parking lot to an elaborate new tomb in Leicester Cathedral. Recently published isotope analysis of two teeth, a femur, and a rib from the skeleton is revealing the diet of the much-maligned late-medieval monarch throughout his life. Results indicate that he likely moved during childhood and later enjoyed an aristocratic diet that grew notably richer (with fresh fish and wildfowl, including swans) upon his ascension to the throne. In particular, researchers from the British Geological



Survey inferred from oxygen isotope data that, once he became king, Richard drank a truly prodigious quantity of imported wine—a quarter of his total fluid intake. As the course of his life is established, so too are the gruesome events of his death. It was clear upon his exhumation that he died a violent death, but detailed examination of his remains shows just how violent. He suffered at least 11 major wounds, nine of them to the skull, including a dagger wound to the cheek, a penetrating injury to the top of the head, and two potentially fatal slices at the base of the skull. According to study author Sarah Hainsworth of the University of Leicester, the injuries suggest a sustained attack, perhaps by several assailants, and that the king was not wearing a helmet.

—SAMIR S. PATEL

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Cults of the Bronze Age



Despite its location at the heart of the Shephelah, one of Israel's most intensively researched regions, the site of Tel Burna had never been excavated. Scholars assumed that there was little there to uncover. But a team led by Itzhaq Shai from Ariel University has discovered, only a few inches below the surface, an abundance of objects, including dozens of



beads, a cylinder seal and scarab, goblets, zoomorphic figurines, chalices, and ceramic masks, all within the remains of a large public building. Shai believes that the presence of so many ceremonial items indicates that the structure, which dates to the thirteenth century

B.C. and measures more than 5,000 square feet, was an important public space where cultic activities, including feasting, burning

incense or other aromatics, offering of votives, and religious processions employing the masks took place. The team also found two very large ceramic *pithoi* (storage vessels) that were imported from Cyprus, and were likely used to safeguard the religious complex's tithes or, perhaps, store food for use in cultic activities. The complex at Tel Burna may also have had administrative functions for the larger settlement in the Late Bronze Age, when it covered about 15 acres on the border between the ancient territories of Judah and Philistia.

—JARRETT A. LOBELL



Symbolic Neanderthals

An artistic design made up of overlapping lines carved on a cave wall was discovered buried under sediment containing Neanderthal artifacts in Gorham's Cave, Gibraltar. Paleolithic art expert Francesco d'Errico of the University of Bordeaux analyzed the engraving and reproduced the process of making it. His analysis shows that a stone tool was used, and that each line was carved precisely, indicating that it was made by an experienced artist. The design at Gorham's Cave is the clearest evidence yet that Neanderthals made artwork, but whatever meaning it carried has been lost in time. "They had the cognitive ability to develop symbolic behavior," says d'Errico, "but it was in a form which was different from what we see later on in history."

—ZACH ZORICH



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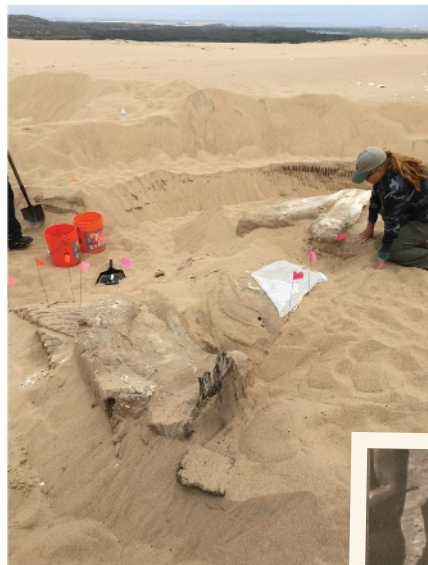
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Hollywood Exodus



DeMille's vision have emerged from the Guadalupe-Nipomo Dunes on the central California coast.

For the 1923 silent film *The Ten Commandments* (remade by DeMille himself in 1956 with both sound and Charlton Heston), DeMille had workers create a massive set in the dunes, including a 120-foot-tall gate flanked by four statues of Ramesses II and 21 sphinxes. Legend has it that the set was destroyed, but over the years archaeologists—amateur and professional—have

uncovered remains from the production and hints that the hollow plaster sphinx statues still lie in situ.

In 2012, the head of one sphinx was excavated, and recently archaeologists from Allied Earthworks, working with the Guadalupe-Nipomo Dunes Center, have excavated the crumbling, weather-beaten body of another. Using the original silent epic to guide their work, the excavators delicately exposed and stabilized the crumbling plaster, which will now be reconstructed for display.

"If 1,000 years from now, archaeologists happen to dig beneath the sands of Guadalupe," wrote DeMille in his 1959 autobiography, "I hope they will not rush into print with the amazing news that Egyptian civilization, far from being confined to the Valley of the Nile, extended all the way to the Pacific coast of North America."

—SAMIR S. PATEL



If there's one thing that the pharaohs of ancient Egypt had in common with legendary filmmaker Cecil B. DeMille, it was an eye for spectacle. Remains of the pharaohs' grand ambitions have stood in the Egyptian desert for thousands of years. Now, some remains of

Egypt's Disappearing Animals

Generations of archaeologists have studied ancient Egyptian tomb paintings and funerary objects for their religious, cultural, and historical significance. Now, a team of ecologists has scrutinized the same resources for evidence of which types of wildlife lived in Egypt at various points in its history—and concluded that the number of large mammal species has declined precipitously over the past 6,000 years, from 37 to just eight.

Handle of a ritual knife (ca. 3300–3100 B.C.) depicting 227 animals of 19 different species

The fossil record in Egypt is too sparse to provide this sort of information, explains Justin Yeakel, a quantitative ecologist at the Santa Fe Institute, so the rich record of artistic depictions is an invaluable resource. "Thanks to the careful observations of Egyptian artisans," he says, "we have one of the few really high-resolution examinations of how animal communities change over time."

Yeakel and his colleagues noted five dramatic shifts in the ratio of predators to prey, one of which occurred in the nineteenth century, along with modern population growth and industrialization. Three of the others coincided with well-known dry periods in the Nile River basin, which have also been associated with turning points in Egyptian history: the beginning of the Dynastic period, around 3000 B.C., and the collapses of the Old Kingdom (ca. 2170 B.C.) and the New Kingdom (ca. 1000 B.C.).

—DANIEL WEISS



Across the Atlantic by Flipper

Tuberculosis (TB), a bacterial infection that kills more than a million people each year and sickens many more, has a short but complicated natural history involving humans, migration around the world, and animals that also carry the disease. Current strains of the bacterium that cause the disease in the Americas are closely related to European varieties, suggesting that TB, like other diseases,



spread around the world as European powers took to the seas in the fifteenth and sixteenth centuries. What this does not explain, however, is archaeological evidence, such as lesions on ancient skeletons, that strongly indicates that TB was present in the Americas well before European contact. Researchers from Arizona State University and the University of Tübingen in Germany analyzed 68 skeletal samples in the Americas with TB-associated lesions and found three—from the Chiribaya culture in Peru, dating to around 1,000 years ago—that provided TB DNA that

could be analyzed and compared to modern and ancient strains. They found that the ancient Peruvian TB bacterium was most akin not to any human strain, but to strains that infect pinnipeds—seals and sea lions. “The fact that the three ancient TB genomes were most closely related to pinniped strains was a huge surprise,” says Anne C. Stone of

Arizona State University. Marine mammals, which ancient South Americans hunted for meat and fur, provide a plausible explanation for how the bacterium crossed the Atlantic before ships did. When the ships did arrive, the strains they carried swept through the Americas, replacing the seal-borne variety.

—SAMIR S. PATEL

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Viking Treasure Trove

A metal detectorist near Dumfries in southwest Scotland has discovered what authorities are hailing as the largest and most significant Viking hoard found in the country in more than 120 years. Among the 100 artifacts, dating from the ninth and tenth centuries, are high-quality gold and silver objects including bracelets, brooches, pins, and armbands, as well as two exceptional items—a silver cross with unique enamel decorations and a rare silver cup. The engraved cup, which was made in the Holy Roman Empire during the time of Charlemagne or his successors, is one of only three Carolingian cups ever found in Britain. After archaeologists unearthed the vessel, wrapped in textiles and with its lid still intact, they discovered that it had also been filled with other valuable objects, including glass beads.

The hoard is especially significant due to its unusually broad range of material, with objects originating in Ireland, Britain, Scandinavia, and continental Europe. “It’s clear that these artifacts are of great value in themselves,” says Fiona Hyslop, Scotland’s cabinet secretary for culture and external affairs, “but their greatest value will be in what they can contribute to our understanding of life in early medieval Scotland, and what they tell us about the interaction between the different peoples in these islands at that time.”

—JASON URBANUS



Paleo-escargot

Thirty-one thousand years ago was apparently a time of culinary adventure in southwestern Spain. A team of researchers excavating Barriada Cave recently uncovered a hearth that contained the shells of roughly 150



snails that had been cooked on a bed of coals—the earliest evidence of people eating escargot. By this time, Neanderthals had disappeared from the area and the population of anatomically modern humans had grown to the point where they had to hunt for new food

sources. Team member Javier Fernández-López de Pablo of the Catalan Institute of Human Paleoecology and Social Evolution says that this type of snail, *Iberus alonensis*, is still considered a delicacy in the region, but not by him. “To be honest,” he says, “I don’t like them too much.”

—ZACH ZORICH

Maya Cities Lost and Found

Since 2007, Ivan Šprajc of the Research Center of the Slovenian Academy of Sciences and Arts has led teams of explorers into the rain forest of Campeche, Mexico, in search of the remains of the Maya civilization. Using aerial photographs, Šprajc identified several likely sites. After three weeks of hacking through dense jungle, his expedition found itself in a previously unknown Maya city, which they named Tamchén. Once they had documented that site, the expedition moved on to another, larger city that turned out to be Lagunita, a site that had been documented in the 1970s but later forgotten. Project surveyor Aleš Marsetič spent several weeks mapping the steles, buildings, and plazas in the two cities. "It's incredible," says Marsetič, "after a thousand years or more these structures are still standing, and the monuments have inscriptions you can still read. It's really amazing."

—ZACH ZORICH



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TENNESSEE: In 1989, just before the Nashville Zoo was constructed, archaeologists at the site found an undocumented cemetery, which was left undisturbed. Speculation

was that the graves could belong to tenant farmers or a community of slaves. Plans were recently made to expand the zoo and relocate the cemetery, which provided anthropologists a chance to learn more about who was buried there. Analysis of the 19 graves excavated revealed African cranial traits and DNA, evidence of hard labor, and artifacts dating to the mid-19th century—indications of a slave cemetery.



ENGLAND: In the ongoing excavations of Vindolanda, one of the northernmost Roman forts, near Hadrian's Wall, excavators found

a wooden toilet seat. Marble and stone seats have been found in other parts of the Roman world, but this is thought to be the only surviving wooden one. The 2,000-year-old bench appears to have been well used and, researchers report, rather comfortable.



UTAH: Rock art can be notoriously difficult to date, so theories about the age of the dozens of enigmatic figures painted in the Great Gallery in Horseshoe Canyon are predictably wide-ranging—from 500 to 8,000 years old. Geoscientists recently used a technique called luminescence dating to determine that the paintings' actual age is between 1,000 and 2,000 years old. The new dating creates fresh questions about the people who made the images.



MEXICO: The ancient city of Teotihuacan relied heavily on maize, but the crop is low in certain nutrients, and frost and drought make it risky to cultivate. Paintings and artifacts suggest that people also turned to pulque, an alcoholic beverage made from agave sap, to fill nutritional needs, especially during maize shortages. But until now, there was no direct evidence of it. A new study has successfully found on potsherds not traces of pulque, but of compounds produced by *Zymomonas mobilis*, the bacterium used in its fermentation.



SPAIN: According to historical sources, the site from which Christopher Columbus set sail in 1492, Palos de la Frontera, had a pottery

works and a building that served as an office, store, tavern, and inn for sailors. Though its location had been inferred, the specific site and components of the port had been lost until recent work there revealed pottery ovens and sherds and the remains of that multiuse building. It was most likely a site where Columbus made some arrangements for the historic voyage to the New World.



NORWAY: A man removing some pesky flagstones from his yard stumbled across a pair of metal tongs—and then a bent sword.

Luckily, he called in

archaeologists, who excavated the grave of a Viking blacksmith, probably dating to the late 8th century. In all, some 200 objects have emerged from the site, including smithing tools such as three hammers, two anvils, ember tongs, and a fire rake, as well as products of his labor, such as an ax, arrows, and a knife. The range of finds suggests he was an important local craftsman.



KAZAKHSTAN: Using Google Earth and satellite imagery, scientists have recently found some 50 geoglyphs, some up to a quarter-mile across, made up of patterns of discrete mounds, in the northern steppes. Excavations, remote sensing, and other studies are under way. It appears there are no structures buried within the mounds, and the purpose of the enigmatic earthworks remains unknown. They may help track early human migration across the region.



NEW ZEALAND: Following a storm, a large piece of a 600-year-old canoe emerged from a beach on South Island. Now undergoing conservation and study, the canoe suggests connections with places across the South Pacific. It is made of local black pine, but employs a sophisticated oceangoing design with ribs and a girder, and has a carving of a turtle on the hull. Both the design and carving were unknown or rare in New Zealand at the time, and represent some sort of cultural continuity with the rest of Polynesia.



EGYPT: In a study of more than 100 skulls excavated from the site

of Amarna, some 28 had remains of preserved hair, which is allowing a unique look into hairstyles and ethnicity in this part of ancient Egypt 3,300 years ago. Among them were several with extensions braided into the natural hair, including one on which there were approximately 70 extensions fastened in different places and layers.



SICILY: Countless piles of amphorae from ancient shipwrecks lie scattered throughout the Mediterranean. So there's nothing very unusual about a particular 2,000-year-old pile 420 feet below the waters of the Aeolian Islands, except for an unexpected find in the ship's bow—a *thymiaterion*, or an incense burner, consisting of a bowl atop a column. It represents rare evidence confirming historical accounts that ancient sailors conducted rituals at sea, including when leaving or entering a harbor or in times of distress.

Top 10 Discoveries of 2014

ARCHAEOLOGY's editors reveal the year's most compelling finds

Ever since the discovery of the largest known Greek tomb was announced in August, archaeology buffs around the world have been eagerly awaiting each successive bit of news from the site. The Amphipolis tomb, which dates to the time of Alexander the Great, is a prime example of how archaeology can captivate the public imagination and easily earned a spot on our list of the Top 10 Discoveries of 2014.

Equally impressive was the discovery, after decades upon decades of searching, of a ship that sank in Arctic waters in present-day Canada almost 170 years ago while looking for the Northwest Passage. That find was deemed so momentous that Canadian Prime Minister Stephen Harper took it upon himself to make the official announcement.

Archaeologists were also hard at work in the lab squeezing as much insight as possible out of limited evidence. Analysis of 6,000-year-old funerary wrappings established that ancient Egyptians practiced artificial mummification much earlier than had been thought. Genetic material from a skeleton found in an underwater cave in Mexico helped shed light on the relationship between the first people to arrive in the Americas and modern Native Americans. And a clever approach to interpreting the genome of Neanderthals revealed factors beyond the raw genetic code that explain how they differed from modern humans.

This year's finds span the globe and tens of thousands of years, but are united in demonstrating archaeology's ability to uncover hidden truths. What better example than the revelation via remote-sensing technologies that Stonehenge is surrounded by thousands of yet-to-be-interpreted Neolithic archaeological features? The discoveries on our top 10 list stand as a reminder that there is always more to learn about our past. — The Editors



The nearly intact skeleton of a teenage girl who lived 12,000 to 13,000 years ago, found in an underwater cave system in Mexico's Yucatán Peninsula, is helping to clarify the relationship between early settlers of the Americas and modern Native Americans.

Naia—the 13,000-Year-Old Native American ■

Yucatán Peninsula, Mexico

The 1996 discovery of the 9,000-year-old remains of a hunter—known as Kennewick Man—near the Washington-Oregon border presented an intriguing puzzle to archaeologists studying the peopling of the Americas. While he was clearly an early American, he had a larger skull and a narrower face that projected farther forward than those of modern Native Americans. These physical discrepancies led scientists to question whether he was a direct ancestor of modern Native Americans, or if a different group of people migrated to the Americas and gave rise to them.

An answer might have been found in a 150-foot-deep water-filled trench known as Hoyo Negro (“black hole”) in an underwater cave system in Mexico’s Yucatán. There, in 2007, divers found the nearly intact skeleton of a 15- to 16-year-old girl they called Naia (for the Greek water nymph). This year, scientists announced what Naia’s remains revealed.

Multiple methods used to date her teeth and bones suggests that she lived between 12,000 and 13,000 years ago, making

her one of the earliest humans ever found in the Americas. Analysis of her mitochondrial DNA, which is passed from mother to child, show that she had a constellation of genes that is common among modern Native Americans. Her skull construction is also similar to that of Kennewick Man.

“She has the physical characteristics we expect to see in Paleoamericans, and the genetics say she and modern Native Americans share ancestry,” says James Chatters, an archaeologist who has studied both Naia and Kennewick Man.

These two ancient Americans—and modern Native Americans—can likely all trace their heritage back to the same source population, a group that is thought to have been isolated for thousands of years in Beringia, the land mass that once connected Asia and the Americas. Researchers now believe that adaptations over the past 13,000 years in the Americas produced changes in appearance, leading to the features we commonly see among today’s Native Americans.

—NIKHIL SWAMINATHAN

Bluetooth's Fortress ■

Køge, Denmark

In a field southwest of Copenhagen, beneath a barely perceptible rise, lies what's left of a fortress that may have been built by Harald "Bluetooth" Gormsson, the tenth-century Viking warrior who became the first king of Denmark. This is the first such fortress to be found in the country in 60 years. Archaeologists used remote-sensing surveys to identify the 475-foot-wide circular structure as well as buildings and

A newly discovered Viking fortress may have belonged to Harald "Bluetooth" Gormsson, the first king of Denmark.



pits in and around it. They also excavated two of the fort's gates and found burned timbers in both, which could suggest that the fortress had been attacked. It is also possible that it was burned when it was no longer needed. There are four other known Viking fortresses in Denmark, all dating to around A.D. 981, during the reign of Bluetooth, and they all have the same layout. This one is providing a new opportunity to learn about the reign of the king who Christianized Denmark and implemented a national government. "It was an amazing time," says Nanna Holm of the Danish Castle Center. "It is when we became who we are today."

—ZACH ZORICH

Mummification Before the Pharaohs ■

York, England

Analysis of funerary wrappings that have been stored in Britain's Bolton Museum since the 1930s has established that Egyptians cooked up recipes to mummify the dead as early as 4300 B.C.—1,500 years earlier than previously thought. The linen wrappings came from cemeteries in the Badari region of Upper Egypt and date to well before the beginning of rule by pharaohs.

Stephen Buckley, an archaeological chemist

at the University of York, found that the wrappings were permeated with a mixture of pine resin, an aromatic plant extract, a plant gum or sugar, a plant oil or fat, and a natural petroleum source. "The recipes being used were essentially the same embalming recipes that were used 3,000 years later," says Buckley, "when the art of mummification was at its height."

Buckley's analysis also revealed that early Egyptians were part of a far-reaching trade network. The chemical signature of the pine oil in the embalming mixture suggests that its closest source would have been in modern-day Turkey.

Intriguingly, the earliest wrappings include chemical components typical of sea sponges. Buckley argues that sponges may have been included in the recipe because they have the ability to regenerate after a part is removed, and Egyptians likely had observed that. Rebirth was the goal of mummification in the pharaonic period, and it seems that it was in earlier times as well.

Interestingly, these early attempts at mummification only involved wrapping the head, hands, and feet. Later on, to improve preservation, it became common practice to wrap the entire body after removing the internal organs and adding natron, a salt that helped dry out the remains.

—DANIEL WEISS



Linen used to wrap the dead in Egypt more than 6,000 years ago was permeated with a mixture of substances very similar to that used when the art of mummification was at its height 3,000 years later.





The remains of a basilica dating to the fifth century lurked unnoticed under the waters of Lake Iznik just off the shore of the ancient city of Nicaea until they were spotted during an aerial survey.

Sunken Byzantine Basilica ■

Lake Iznik, Turkey

Only 100 miles from Istanbul, the ancient city of Nicaea, on the shores of Turkey's Lake Iznik, is not remote or unknown. So archaeologist Mustafa Sahin was in for a shock when a routine aerial survey of the lake revealed traces of a fifth-century basilica. "I did not believe my eyes when I saw it under the helicopter," says Sahin. "I thought to myself, 'How did nobody notice these ruins before?'" The site is now slated to become an underwater archaeological museum.

—ERIC A. POWELL

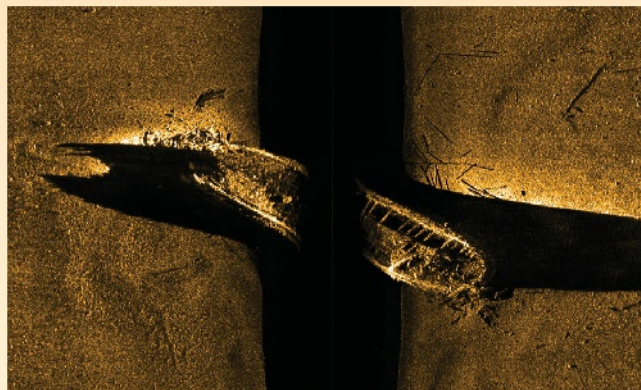
Canada Finds *Erebus* ■

Victoria Strait, Canada

Rare is the archaeological discovery that gets announced by a head of state. But the discovery of a shipwreck in frigid Arctic waters got just that treatment in September from Canadian Prime Minister Stephen Harper. “I am delighted to announce that this year’s Victoria Strait Expedition has solved one of Canada’s greatest mysteries,” Harper’s statement reads, “with the discovery of one of the two ships belonging to the Franklin Expedition lost in 1846.”

Sir John Franklin commanded the two ships—HMS *Erebus* and *Terror*—that sailed from England in May 1845 to search for the Northwest Passage. The ships’ disappearance with no trace led to three decades of searches by land and sea, which themselves claimed several ships, including HMS *Investigator*, discovered in 2010 (“Saga of the Northwest Passage,” March/April 2012). More recently, another three decades were spent excavating sites on nearby islands and searching for the wrecks with sonar, capped by this year’s Parks Canada-led expedition.

A ship that set out from England in 1845 in search of the Northwest Passage has finally been found in the Canadian Arctic after a decades-long effort.



Three weeks after the announcement, archaeologists confirmed that the ship is *Erebus*, the one that had been captained by Franklin himself, and reported that it is in remarkable shape. The discovery is more than just the solution to a mystery, though: Harper connects the wreck to Canada’s claim of sovereignty over vast portions of the Arctic—and the massive oil, gas, and mineral reserves they appear to hold.

—SAMIR S. PATEL



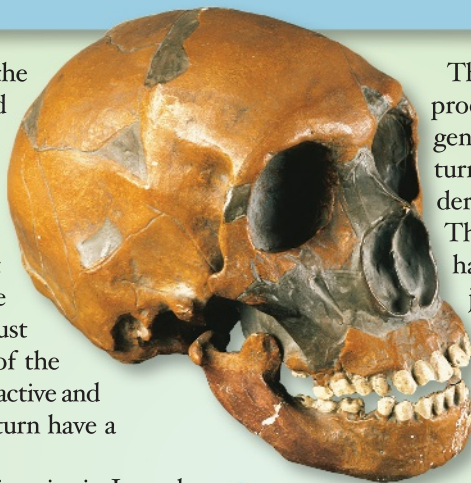
Decoding Neanderthal Genetics ■

Jerusalem, Israel

The first draft of the sequence of the Neanderthal genome was published in 2010 (“Neanderthal Genome Decoded,” July/August 2010). One might think that it would tell us everything we need to know about the genetic differences between modern humans and our closest evolutionary cousins. But it turns out the raw genetic code is only half the story. Just as important is epigenetics—features of the genome that determine which genes are active and which are inactive, factors that can in turn have a dramatic effect on one’s traits.

Now, researchers from Hebrew University in Jerusalem and the Max Planck Institute for Evolutionary Anthropology, where the original sequencing took place, have found an ingenious way to investigate Neanderthal epigenetics. Their findings have provided tantalizing clues to how the bodies and brains of modern humans have evolved since splitting from Neanderthals several hundred thousand years ago.

The usual methods for determining whether genes are active or inactive are highly destructive and cannot be used on scarce Neanderthal genetic material. Instead, the researchers managed to detect telltale epigenetic signs in the Neanderthal genome based on the insight that certain portions of ancient DNA tend to be misread in a distinctive way by DNA sequencers.



This reading of Neanderthal epigenetics produced a number of novel results. Two genes involved in determining body shape turned out to be highly inactivated in Neanderthals and highly activated in humans. This could help explain why Neanderthals have thicker hands, wider knee and elbow joints, and shorter limbs. “These genes are identical between us and Neanderthals,” says Liran Carmel of Hebrew University. “So we are convinced we have found a region where only the epigenetics is different.”

Many genes associated with diseases—in particular psychiatric and neurological disorders such as Alzheimer’s disease, autism, and schizophrenia—also appear to be activated in modern humans but not Neanderthals. Carmel says the activation of these genes may have produced an evolutionary catch-22: bestowing a benefit, perhaps by changing the wiring of our brains, but also introducing an increased risk of disease.

—DANIEL WEISS

The secret to differences between modern humans and Neanderthals appears to have as much to do with which genes are switched on and which are switched off as it does with differences in the raw genetic code.

Buddhism, in the Beginning ■

Lumbini, Nepal



Excavations at Lumbini in Nepal have revealed never-before-understood details about the earliest years of Buddhism. According to tradition, Lumbini is where Maya Devi gave birth to Siddhartha Gautama, who became the venerated sage known as Buddha. Many ancient Buddhist shrines date

A dig at an active Buddhist shrine in Nepal has uncovered a timber structure dating to around the sixth century B.C. that researchers believe is the world’s oldest known Buddhist shrine.

to the third-century B.C. rule of Ashoka, a Mauryan Dynasty emperor who was key to the early spread of Buddhism. Under the remains of Mauryan temples at Lumbini (themselves topped by a succession of others), archaeologists uncovered evidence of an earlier timber structure upon which all the later temples were based. It dates to around the sixth century B.C., and the researchers, led by Robin Coningham of the University of Durham, believe this makes it the oldest Buddhist shrine in the world. This early date may also help inform the discussion of when Buddha lived. The excavation took place in the middle of an active shrine, with monks and pilgrims sometimes praying and chanting as the archaeologists worked below.

—SAMIR S. PATEL

Greece's Biggest Tomb ■

Amphipolis, Greece

Four decades ago, after excavating hundreds of burials in the ancient Greek city of Amphipolis, about 60 miles north of Thessaloniki, Dimitris Lazaridis turned his attention to an enormous mound called the Hill of Kasta, which he believed contained a tomb or funerary monument of tremendous importance. Lazaridis' work soon took him elsewhere, and archaeologists didn't return to Kasta until 2012, when they began to expose the 1,500 feet of marble and limestone walls encircling the mound. This past summer the team found the entrance to the extraordinary monument Lazaridis suspected was there from the start. Work at the site is ongoing, but thus far archaeologists have uncovered a large entranceway guarded by marble sphinxes and three separate chambers. The first is paved with white marble and contains a pair of caryatids standing 10 feet high. The second chamber's floor is covered with a mosaic of the god Pluto abducting Persephone. And the third, entered through a four-foot-wide marble door, is filled with more sculpture. The tomb dates to the last quarter of the fourth century B.C., when Amphipolis was an important city under Greece's Macedonian rulers.

—JARRETT A. LOBELL



The entranceway to the massive Amphipolis tomb is flanked by two exceptionally well-carved stone sphinxes sitting atop a doorway, much of which would have been brightly painted.

Seaton Down Hoard ■

Devon, England



A metal detectorist in southwest England has discovered one of the largest Roman coin hoards ever found. The Seaton Down Hoard consists of 22,000 coins, dating from the A.D. 260s through the 340s. According to Vincent Drost, a British Museum numismatist researching the coins, the hoard may represent an individual's private savings, a commercial transaction, or a soldier's wages.

Despite the hoard's remarkable size, it consists exclusively of low-valued copper alloy *nummi*, making the entire collection worth only the equivalent of a few gold *solidi*. Nonetheless, it will likely prove valuable to researchers. Archaeologists believe the Seaton Down Hoard was buried in the 340s, during the rule of co-emperors Constantius II and Constans. "A detailed study of the coins will provide important information on the features of Constantinian coinage and on coin use and supply in Britannia in the mid-fourth century," says Drost.

—JASON URBANUS

This giant hoard of 22,000 Roman coins discovered in southwest England was most likely buried in the A.D. 340s.

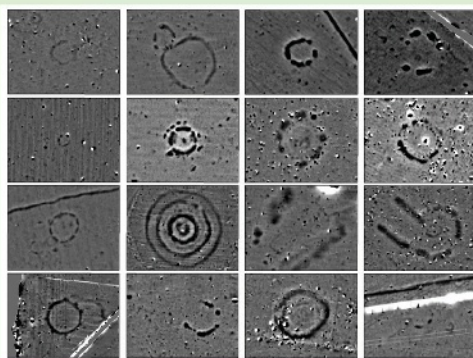


Under Stonehenge ■

Wiltshire, England

As if Stonehenge weren't spectacular enough, an unprecedented digital survey—involving aerial laser scanning, ground-penetrating radar, and other geophysical and remote-sensing technologies—has revealed that the iconic 5,000-year-old standing stones were part of a much broader Neolithic ceremonial landscape. Unveiled at the British Science Festival in September, the research has revealed 17 new monuments and thousands of as-yet-uninterpreted archaeological features, including small shrines, burial mounds, and massive pits, across nearly five square miles of the Salisbury Plain.

The research is also providing new insights into already documented features. For example, geophysical surveying of the “Cursus”—a two-mile-long mound north of Stonehenge—identified two massive pits that align astronomically with Stonehenge, in addition to a series of gaps in the mound. “The pits show how the Cursus, which was constructed 400 years earlier than Stonehenge, influenced the



Remote-sensing surveys have revealed a vast array of archaeological features in the vicinity of Stonehenge, making clear that it was part of a much broader ceremonial landscape that included monuments, shrines, burial mounds, and pits.

placement of the standing stones,” explains Vincent Gaffney of the University of Bradford. “We think that the gaps in the Cursus would

have guided the movement of people as they processed to Stonehenge, contradicting the [previous] thinking that few people approached the standing stones.” Further, remote sensing at Durrington Walls—a mile-wide ritual monument close to Stonehenge—revealed that it used to be associated with up to 60 huge standing stones, some of which may now lie under earthen banks. “In the past we had this idea that Stonehenge was standing in splendid isolation, but it wasn’t,” says Gaffney. “It’s absolutely huge.”

—KATE RAVILIOUS

America's First War

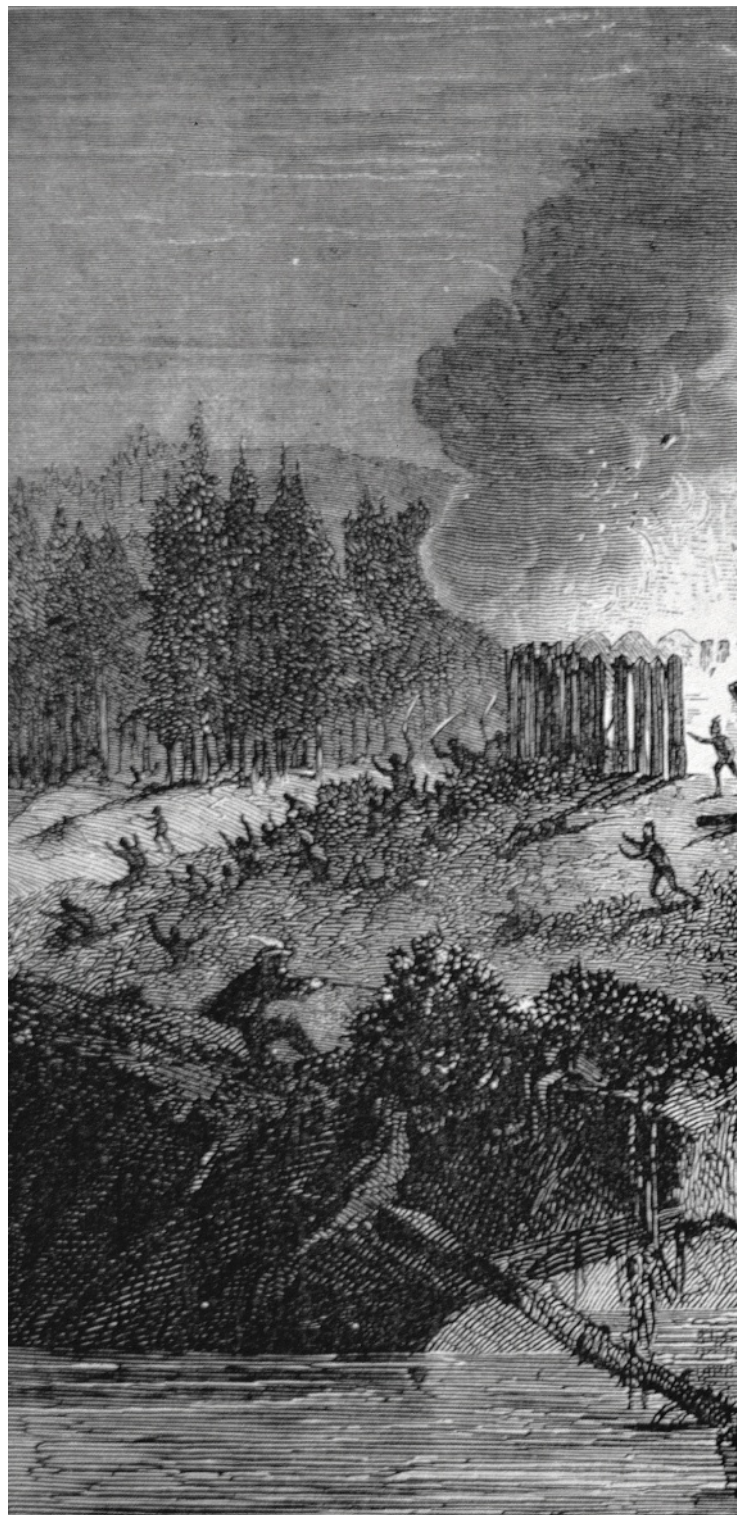
Uncovering evidence of a little known colonial-era conflict that forever altered the dynamics of Native American and European relations in North America

by JASON URBANUS

EVERY YEAR IN EARLY JUNE, members of the Mashantucket Pequot Tribal Nation in Connecticut gather at dawn for a “First Light” ceremony. The tradition dates back generations, as far back as tribal elders can remember. Although there is singing, dancing, and drumming, the affair is a solemn one. They come together to commemorate their deceased ancestors on the anniversary of the Battle of Mistick Fort, the bloodiest engagement of the seventeenth-century conflict known as the Pequot War. Outside their community, with the exception of historians, few people know of this definitive chapter in Native American and early colonial history.

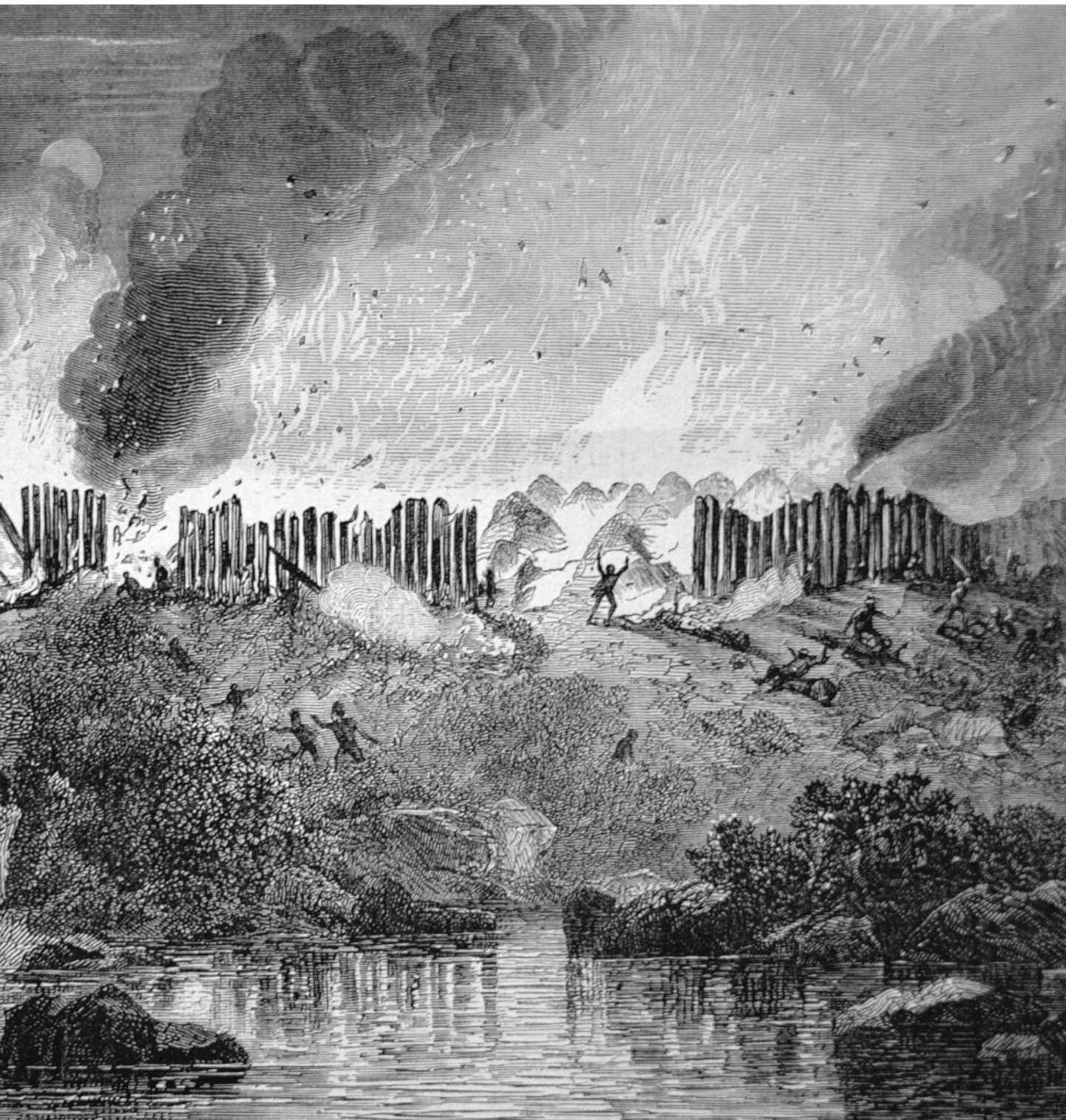
The deadly conflict, which raged between the years 1636 and 1638, not only pitted English settlers against the Pequot tribe of southern New England, but also unraveled old Native American alliances and resulted in fierce Native versus Native warfare. Often characterized as America’s first war, it changed the dynamics of English and Native interaction in the New World. “This is really the first all-out regional conflict between Native peoples and the English,” says Kevin McBride, director of research at the Mashantucket Pequot Museum and Research Center and a professor at the University of Connecticut. “It lasted over a year, took place over a thousand square miles, touched dozens of communities, and involved thousands of combatants.” It had profound effects on Native communities regionally, and later during westward expansion. “It never quite goes away,” says McBride.

The painful legacy of the Pequot War stems from both its intense and violent clashes and the vindictive behavior exhibited by both the English and Native peoples. In the end, the English and their Native allies nearly succeeded in eliminating the entire Pequot population. Although exact numbers are difficult to ascertain, no more than a few hundred Pequots survived out of an early-seventeenth-century population of more than 8,000. Their numbers were reduced not just by warfare, but by



epidemic, deportation, and enslavement. “It was certainly one of the first cases of cultural genocide [in the New World],” says McBride. “At the close of the war, the [English] strategy was basically to execute men and leaders, while women and children of standing weren’t kept close. They were shipped away.”

McBride is currently director of the Battlefields of the Pequot War Project, a multisite archaeological investigation into the critical actions and engagements of the Pequot War.

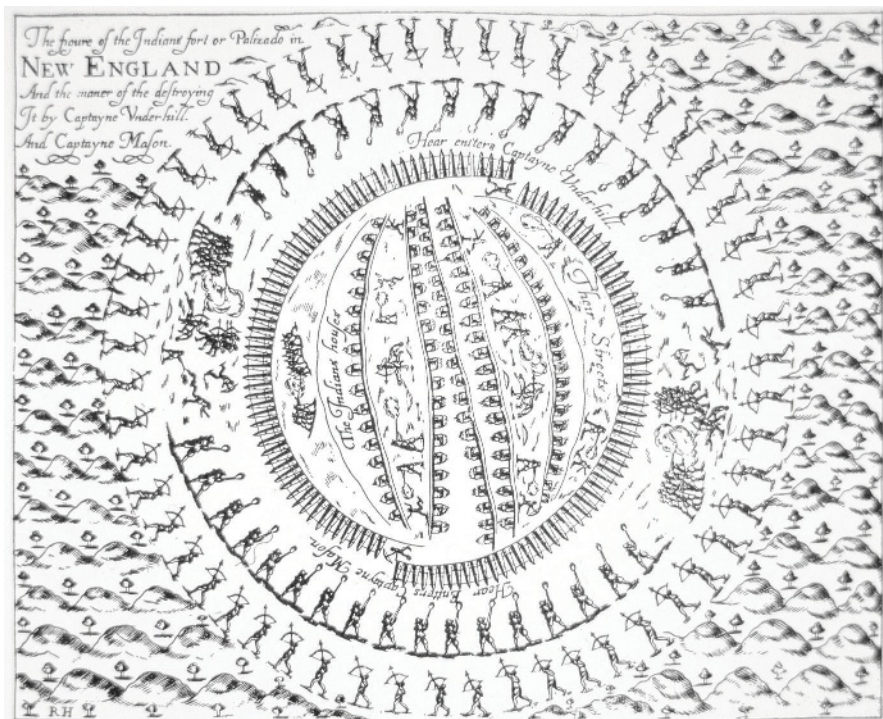


As he envisions it, the project will explore at least a dozen sites across three states—Rhode Island, Connecticut, and New York—where important battles of the Pequot War occurred. The majority of these sites are being examined by archaeologists for the first time.

Thus far, the most significant site they have investigated is that of the Battle of Mistick Fort—often referred to as the “Massacre at Mystic.” Even as the Mashantucket Pequots have

On the morning of May 26, 1637, English troops and their Native allies attacked and burned the Pequot village of Mistick, killing more than 400 Pequot men, women, and children, as shown in a 19th-century engraving.

kept its history alive for generations, the Battlefields Project is now forcing a reevaluation of centuries-old assumptions about the event.



A 17th-century woodcut print depicts a bird's eye view of the Battle of Mistick. The circular Pequot palisade is surrounded by English forces (inner ring) and their Native allies (outer ring).

IN THE FIRST HALF of the seventeenth century, Dutch traders became the first Europeans to establish a permanent presence along the Hudson River Valley and Long Island Sound. During the 1610s and 1620s, the Dutch and Pequots had an uneasy but mutually beneficial economic relationship. These two groups controlled the distribution and exchange of European goods, fur pelts, and wampum. However, by the 1630s, major changes had occurred that would set the inevitable course toward war. Most notable was the arrival of English settlers in the Connecticut River Valley. The Pequots, who inhabited central and eastern Connecticut, ultimately came to be hemmed in between two territorially hungry European empires.

The Europeans' presence gradually changed the dynamics of power among local Native peoples, and the Pequots initially capitalized on the situation, growing into the dominant Native American group in southern New England. "Native people are now competing for access to European goods, so whoever controls the production and distribution of wampum, and then the territory through which it first goes, has pretty much got it," says McBride. "That was the Pequot strategy." By the eve of the Pequot War, through a combination of intermarriage, warfare, diplomacy, and subjugation of other tribes, the Pequots had expanded their control over thousands of square miles, stretching from Long Island Sound inland along the Thames, Mystic, and Pawcatuck Rivers.

At the same time, the now-entrenched English sought to break up the profitable Pequot-Dutch monopoly. The Pequots' own Native alliances began to crumble as less powerful tribes

sought to free themselves from Pequot-Dutch subjugation and sided with the English. The English and their new Native allies wanted to wrest control and territory from the Pequots, a goal that inexorably led to war.

THE PRIMARY GOAL of the Battlefields Project, organized through the Mashantucket Pequot Museum and Research Center, is to identify, investigate, and preserve the battlefields and historical sites associated with the Pequot War. It is also part of the National Park Service's American Battlefield Protection Program. The project uses a broad range of investigative methods, beginning with a close examination of seventeenth-century literary accounts found in libraries in the United States and England. These include narratives by the two English military leaders, John Mason and John Underhill, who led troops to battle at Mistick. Passages from their writings are proving instrumental in helping archaeologists locate potential Pequot War sites on modern topographical maps. Since most of the sites in question are

located on private land, the Battlefields Project relies heavily on noninvasive archaeological methods such as GIS modeling, remote sensing, and survey archaeology, although small-scale excavation is also used in conjunction with these approaches. The most important tools available to the archaeologists though, are metal detectors. Although their use in archaeology can be controversial, they are proving essential to the field of battlefield archaeology. McBride and his team have been aided considerably by a local group of experienced metal detectorists known as the Yankee Territory Coinshooters.

THE MOST EXTENSIVE WORK undertaken by the Battlefields Project has involved retracing the fateful events of May 25 and 26, 1637, surrounding the fortified Pequot settlement at Mistick (modern Mystic, Connecticut). When English forces stormed the village's wooden palisades, it was to be the major turning point in the Pequot War, shifting the balance of power in southern New England permanently in English favor. While researchers have long known the skirmish's outcome, only recently have they come to understand that the encounter was far more complex than traditionally believed, and that the two sides were more closely matched than history had recorded. According to McBride, the English very nearly came out on the losing end. The only thing that saved them was their decision to torch the Pequot village. It is that definitive act that has made the Battle of Mistick Fort infamous in American history.

During the first year of the war, the Pequots won nearly every engagement, inflicting numerous casualties upon the



Archaeologists recovered brass arrow points that helped identify the position of Native American fighters both in the interior and exterior of the fort.

English garrison at Saybrook Fort. The violence escalated when the Pequots began attacking colonial civilians. “Pequots know things are unraveling,” says McBride. “They need to send a message that they can stand up to the English, and that they can take care of their own. They attack Wethersfield [an English village], and for the first time, they kill women and children.” He adds, “I think that it was a calculated risk on their part.” The attack on Wethersfield had historic and serious consequences. It led directly to a declaration of war by Connecticut Colony, traditionally viewed as the first official declaration of war by the English on an indigenous people in America.

The English forces who marched on the Pequots at Mistick a month later were experienced soldiers. Many of them were veterans of the Thirty Years War in Europe, a fact rarely publicized. Heavily armed, the colonists were determined to strike a fatal blow to the Pequots. “This was probably one of the best planned and equipped expeditions, not at all what we had previously thought,” says McBride. “We have a much different perspective of it now.”

The advancing English troops were accompanied by a contingent of 250 allied Native warriors, consisting mainly of the Pequots’ neighbors, the Mohe-

gan, Niantic, and Narragansett. The English and Native fighters camped briefly for the evening, around two miles north of Mistick, in an area known today as Porter’s Rocks, in separate locations only a few hundred yards from one another. Their stay that night was brief, lasting no more than four hours, but the Battlefields Project has been able to locate both encampments.

Archaeologists have uncovered artifacts such as musket balls, pyrite, broken trigger mechanisms, and wrought-iron objects associated with seventeenth-century European weaponry that have helped identify the English position. The Native encampment was distinguishable by the presence of several brass items, along with various brass beads that fell from Native shirts or breastplates. The presence of small, recut brass artifacts is frequently an indication of Native American activity during this period, since they often used the large, easily malleable European brass kettles to manufacture objects more desirable and useful to their own communities.

THE LOCATION OF Mistick Fort—so-called because of the tall defensive palisades that encircled the Pequot village—has been recognized for at least a century and a half. In the 1870s, a controversial statue of John Mason, the leader of the English assault, was erected atop Pequot Hill in Mystic to commemorate the site. Until the current project was initiated, however, the fort’s existence had not been archaeologically confirmed. The site was located almost entirely on residential land, so McBride sought ways to involve the community to assuage residents’ concerns. He discovered that one of the best approaches was to conduct fieldwork on the weekends, when homeowners were more likely to be around and could openly observe or even volunteer.

In addition, community members worried that if anything historically significant were discovered on their property, the Mashantucket Pequot tribe might attempt to lay claim to the



A concentration of broken metal artifacts from European weapons, including rifles and crossbows, helped researchers define areas of intense hand-to-hand fighting.

land. These fears were relieved by tribal council members, who met with the community and sent a letter to each landowner stating that “neither the tribe nor any government authority has any rights to this historical site, and there is no legal basis to take or restrict your land in any manner.”

With these obstacles overcome, work finally began in 2009. Over the next several years, the investigation into the Battle of Mistick Fort would prove groundbreaking. Using the methods of battlefield archaeology popularized by Douglas Scott in his analysis of the Battle of Little Big Horn, McBride and his team have been able to reconstruct the assault on Mistick in detail. This involved collecting and analyzing objects from the battlefield and associating them with the movements and actions of specific troops. The contrasting military equipment



Metal lugs, buttons, beads, and scissors were among the artifacts that indicated the location of the allied Native American encampment on the eve of the attack.

and dress of the English and the Pequots has made it possible to identify where, when, and by whom specific actions were conducted.

ON THE MORNING OF May 26, 1637, the English split their forces in two, under the command of Mason and Underhill. The plan was for the English to assault the Pequot settlement from opposite sides while their Native allies formed a ring around the perimeter and served as auxiliary support. Mason and his men were the first to enter the village, an action that nearly got Mason killed. The key to establishing these events was pinpointing the location of the palisades and the settlement's boundaries in order to distinguish interior and exterior engagements from one another. The massive fire that ultimately consumed the fort left discrepancies in the soil, which researchers were easily able to identify using electrical resistivity and test trenches.

Once the borders of the Pequot settlement were outlined, McBride could begin to separate the individual actions of the skirmish by the English, their Native allies, and the Pequots. The evidence he uncovered revealed a very short but intense encounter. He was able to track Mason's forces as they entered the village and swept through it. The position of the English forces could be gleaned, in part, by the presence of intact musket balls, which were frequently dropped as soldiers attempted to reload and fire quickly under duress. Additionally, the direction of the attacking volley could be identified by concentrations of melted or impacted shot, which deform as they hit targets. In a similar fashion, by analyzing the pattern of Pequot projectile points, the archaeologists were able to surmise the direction and movement of the Pequot forces. Large concentrations of metal artifacts other than musket balls, such as broken gun parts or armor, indicated areas where hand-to-hand combat likely took place.

Using Mason's written journal, the boundaries of the fort, and the artifact distribution pattern and analysis, archaeologists have been able to ascertain the sequence of events of the Battle of Mistick Fort. “I took apart the narratives and looked at unit actions and what their potential [archaeological] signatures would look like,” says McBride. “I saw Mason's first volley, I saw his entry into the fort, I saw his movement. You can see it.”

The results show chaotic and intense fighting within a confined space. The difficulty the English had in maneuvering was compounded by the array of wigwams full of women and children. In addition, what Mason and the English did not know was that the Pequots had prepared for the English attack and reinforced the village with an extra 150 warriors the night before. The English, who expected only 75 Pequot warriors,



The Battlefields of the Pequot War Project has conducted metal-detecting surveys at Mistick Fort (top) and a small-scale excavation of the home of Captain George Dennison, veteran of the Pequot War, to continue to create a picture of the events and aftermath of the conflict.

did not anticipate such resistance. “Of the initial number of men who entered the fort,” says McBride, “50 percent were killed or wounded in 15 minutes. That’s how close the English came to losing that battle.”

According to McBride, Mason, faced with the annihilation of his contingent, made a dramatic decision. “If you count the guys that went in with him, of those 18,” he says, “11 were killed or wounded. That’s when Mason said, ‘We must burn it. Burn it.’”

Once the fires were set, it became nearly impossible for the Pequots trapped inside the palisades to make their way out. Those that did ran directly into enemy fire. A concentration of artifacts discovered by the archaeologists indicate that the second contingent of English troops had set up a position 150 feet south of the fort’s entryway, a strategic location from which they could strike down any Pequots fleeing the flames. Once the English set fire to the village, what had started out as a successful engagement for the Pequots quickly became a massacre. Overall, more than 400 Pequot men, women, and children perished, about half of them burning to death.

Perhaps the most revealing discovery of the Battlefields Project’s investigation was that fighting continued that day even after the destruction of Mistick Fort. The English were faced with a six-mile journey through swampy and treacherous terrain in order to reach their ships moored near present-day New London, Connecticut. Archaeologists have recently discovered the trail by which the English retreated, littered with evidence of the barrage they met. While the English had lost more than 30 percent of their total numbers in Mistick and were bogged down by heavy armor and wounded soldiers, the surviving Pequot were reinforced by warriors from the surrounding region. “We see evidence of really intense fighting, which was not at all what we anticipated,” says McBride. Hundreds of battle-related objects and projectiles attest to the nightmarish journey the English endured on their way home.

WHILE THE EVENTS OF the Battle of Mistick Fort did not immediately end the war, they signaled the beginning of its final stage. The losses suffered by the Pequots were irreversible and the outcome undeniable. Upon the war’s conclusion, the English took unprecedented steps to eradicate the Pequot population. The surviving Pequots were banned from their former territory and even from calling themselves “Pequots.” “The English were petrified of a Pequot insurgence,” says McBride, adding, “They don’t ever want them coming back together or building new alliances.” The European military strategy of total warfare, a policy that would be employed against Native communities of the New World throughout the next two centuries, became clear.

The Pequot, however, did survive. In 1983, their descendants were federally recognized as the Mashantucket Pequot Tribal Nation. The work conducted by the Battlefields of the Pequot War Project has not only helped create a new awareness of that historically important conflict, but has even helped reshape its legacy in the twenty-first century. “There’s a part



English troops faced a difficult route through wooded wetland as they returned to their ships in New London, Connecticut, and also endured Pequot counterattacks along the way.

of this project called Memory and Legacy,” says McBride. “It’s allowing us to look at the way the war has been viewed among the descendant communities from the seventeenth century through to the present day.” In that spirit, the project has helped bring together the various communities involved, hundreds of years later. In 2012, on the 375th anniversary of the Battle of Mistick Fort, the Mashantucket Pequot Tribal Nation was able to hold their First Light ceremony at the site of the old Mistick Fort for the first time. And, as another first, they also invited members of the nearby Mohegan and Narragansett tribes—their centuries-old adversaries—to participate in the event. The owner of the property where the commemoration of the battle took place is a distant descendant of the English captain John Mason. “It’s not just a battlefield project,” says McBride. “It’s a window—a window into diplomacy, warfare, tactics, cultural complexity, material culture, and the adaptation of the English in the New World and vice versa. There is nothing you can’t explore through the lens of the Pequot War.” ■

Jason Urbanus has a Ph.D. in archaeology from Brown University.

FOR NEARLY THE ENTIRE duration of ancient Egypt's New Kingdom (1539–1069 B.C.), pharaohs were buried in a secluded valley between tall limestone cliffs across the Nile from the capital of Thebes. The limestone was easy to dig into and provided a sturdy structure for tombs and walls that served as ready canvases for religious inscriptions and murals. The royal necropolis, which the ancient Egyptians called *ta set aat*, or the “Great Place,” is known today as the Valley of the Kings. Looming over the Valley is a peak with a shape reminiscent of the pyramids in which earlier pharaohs had been buried, but which in antiquity had made easy targets for looters. The Valley is relatively remote and offers only a few entry points, so it appeared easier to safeguard against tomb robbers.

The tombs of the pharaohs were elaborate affairs. Archaeologists who excavated them starting in the early nineteenth century discovered that they consisted of multiple rooms connected by lengthy passageways and stairways. Their walls were covered with religious texts and portrayals of pharaohs interacting with the gods. They were furnished with a broad array of objects to

help the pharaohs thrive in the afterlife. But not all the tombs in the Valley of the Kings were designed for pharaohs. Alongside their palatial tombs were an equal or greater number of more modest ones. The inhabitants of a few of these tombs dating to the 18th Dynasty have been identified and are mostly relatives of the pharaohs or high state officials: Queen Tia'a, the wife of the pharaoh Amenhotep II (r. 1426–1400 B.C.); Maiherpri, who grew up in the royal nursery, possibly as a childhood companion of an 18th Dynasty pharaoh; Userhat, an overseer of the fields of Amun, most likely under Thutmose IV (r. 1400–1390 B.C.); and Yuya and Thuya, the parents of Tiye, the great royal wife of Amenhotep III (r. 1390–1353 B.C.).

For the most part, the question of who besides the pharaohs got to be buried in the royal necropolis has remained a mystery. Now, a team led by archaeologist Susanne Bickel of the University of Basel has identified a large number of the people buried in one of these non-pharaonic tombs, helping to provide some new answers. “For a number of years, we have been frustrated as we have opened tombs and found mummies, but we have never found any names or titles to identify who

More than a century after its discovery, a tomb in Egypt's Valley of the Kings is yielding new insights into who was buried in this elite necropolis

by DANIEL WEISS



Excavations of a long-overlooked burial in the Valley of the Kings have led to the identification of a number of previously unknown members of the court of Amenhotep III.

they were,” says Bickel. “Now all of a sudden we have been able to identify 30 individuals.”

THE TOMB BICKEL IS investigating is called KV40. KV stands for “King’s Valley,” and tombs have been assigned numbers based on the order of their discovery. KV40 is among the largest tombs in the Valley of the Kings that was not designed for a pharaoh, consisting of a deep shaft leading to a corridor, a spacious central room, and three smaller side rooms. In the tomb, Bickel found thousands of fragmentary remains—broken pottery, mummified body parts, and pieces of burial material—all overlaid with a large helping of silt. The pottery sherds, which came from three-foot-high containers that held materials used as part of the mummification process, were found almost entirely in the large central room, and the human remains were almost entirely in one of the side rooms. Bickel believes this separation reflects the original arrangement of the burials.

In several field seasons at the site, Bickel has sorted through the rubble, focusing particularly on piecing the pottery sherds together. On the reassembled containers, she has made out

inscriptions indicating the identities of a number of those buried in the tomb during the 18th Dynasty reign of Amenhotep III. The dating of the burials is suggested by a number of seal impressions with the pharaoh’s name and appears to be supported by the nature of the pottery. Among the people named in the inscriptions are 10 identified as king’s daughters, four identified as king’s sons, and five to seven identified—by a symbol attached to the end of their names—as non-Egyptian women. Several of those buried in the tomb during Amenhotep III’s reign are unusually well-mummified infants, suggesting they were royal children. In addition, the inscriptions describe several of the king’s daughters as belonging to the “House of the Royal Children” (*per na mesu nesu*). None of the names of the king’s children included in the inscriptions were previously known.

“It’s been a conundrum for some time where the royal women and children were buried,” says Salima Ikram, an Egyptologist at the American University of Cairo. “So here in this tomb suddenly a bunch of missing people have appeared, which is really quite wonderful.”

Despite the Valley of the Kings’ perceived impermeability,

Beyond the Pharaohs





The tomb KV40, looted in antiquity and again in the late 19th century, when it was also set on fire, shows evidence of scorching on the walls and ceilings, but material on its floor was largely unharmed.

almost all of its tombs have been robbed over the centuries. KV40 was apparently looted extensively during the 21st Dynasty (1069–945 B.C.) as part of a state-sponsored campaign to recycle funerary materials, and was used anew for burials in the 22nd Dynasty (945–715 B.C.). A number of the mummy parts have funerary materials linking them to this later period of burials, but no evidence of their identities has been found. The tomb was given its number by French archaeologist Victor Loret in 1899, though it seems he never looked inside it himself. Bickel suspects that Loret's workmen investigated the tomb and told him it was a shambles and not worth bothering with.

KV40 was looted again in the late nineteenth century, around the time Loret was active in the Valley of the Kings, and a fire was set that scorched the tomb's limestone walls and ceilings. Material piled up on the floors was mostly unharmed, aside from being coated with a layer of soot. Bickel believes it is likely that the nineteenth-century looters set this fire by throwing their torches into the tomb before sealing it up, possibly in an attempt to ward off punishment by offended spirits. In Bickel's view, it is lucky the tomb evaded Loret's interest, because in his time archaeologists would have made little of its contents. "They probably would have said, 'It's broken, nothing interesting, let's clean it out,'" she says. "Nowadays, there is so much information to be gained even when finds are in such a desperate state of preservation."

Along with the new information from KV40 come new questions. Chief among these is: Who were the non-Egyptian women lacking royal titles who were buried along with the royal children? Bickel believes the answer can be deduced from what is known of Egyptian history of the time.

DURING THE REIGN OF Amenhotep III, Egypt was at the height of its power. Nubia to the south, with its plentiful gold supplies, had been subdued a century earlier. More recently, Egypt had forged peace treaties on favorable terms with

perennial rival Mitanni, in what is now Syria, as well as with other Near Eastern peoples, including the Hittites and the Babylonians. To solidify these relations, Amenhotep III welcomed a series of daughters of Near Eastern leaders to his court as diplomatic brides.

A number of these foreign princesses are reported to have arrived with extensive entourages. A scarab from 1381 B.C. commemorating Amenhotep III's marriage to a Mitanni princess named Gilukhepa noted that she was accompanied by 317 female attendants. Later in his reign, Amenhotep III married a second Mitanni princess, Tadukhepa, who was reported to have arrived with a retinue of 270 female attendants. This is known from details of negotiations between Amenhotep III and the Mitanni king, Tushratta, found in the Amarna letters. This rich cache of diplomatic communications recorded on clay tablets was dug up in 1887 by a villager in Amarna, where

Amenhotep III's son, the infamous pharaoh Akhenaten, moved the capital after taking power in 1353 B.C. ("Beyond the Palace Walls," May/June 2014). Akhenaten is thought to have gone on to marry Tadukhepa after his father's death, and she may have changed her name at this point to Kiya. Amenhotep III also married two Babylonian princesses who may have been accompanied by retinues as well.

The non-Egyptian women buried in KV40 during Amenhotep III's reign—all but one of whom had Near Eastern names—may have been part of these retinues, proposes Bickel. "These foreign women do not have titles, so they were probably not the main princesses the kings of the Near East sent to Egypt," she says. "But perhaps they were some of these accompanying women." This is the most plausible explanation for the origin of these women, agrees Ikram. "Of course some of them might have been people who were descendants of settlers from the Near East," she says. "You can't completely dismiss that, but it is unlikely."



Inscriptions on pottery sherds (left) found amid the rubble in KV40 have helped identify people buried in the tomb during the reign of Amenhotep III. A number of jars (right) have been pieced together by researchers.

All the people buried in KV40 during the reign of Amenhotep III were buried together, Bickel suggests, as opposed to having been moved there from different tombs at a later date. “Despite the fragmented state caused by the robberies,” she says, “it appears that the burials were laid out in good order, and every burial has its equipment and jars.” Assuming that the foreign women and the king’s children were all buried together, Bickel suggests they may have lived together as well in one of several women’s quarters associated with the royal court. If this were the case, then the king’s sons named in the pottery inscriptions were most likely quite young, which means they would still have been living in a nursery in the women’s quarters when they died. In the coming field season, anthropologists will analyze the mummified remains in KV40 to determine the gender and age of those buried there, which may help confirm this.

In the future, if the Egyptian government allows it, Bickel hopes to carry out isotopic analysis on the mummified remains to gain insight into where the non-Egyptian women came from, as well as where in Egypt all those buried in the tomb lived. Two primary candidates are the Gurob palace, in the north of Egypt near Memphis, and the Malkata palace in Thebes, across the Nile from the Valley of the Kings.

A NUMBER OF OBJECTS FOUND at the Gurob palace during digs in the late-nineteenth and early-twentieth centuries refer to Amenhotep III and his great royal wife, Tiye, says Frederik Hagen, an Egyptologist at the University of Copenhagen and codirector of an ongoing excavation at the Gurob palace site. Hagen adds that little is known of what life was like at the palace during Amenhotep III’s reign. However, a papyrus dating to a century later, during the 19th Dynasty reign of Ramesses II (r. 1279–1213 B.C.), refers to one of Ramesses’ Hittite wives receiving textiles from the palace storeroom. That makes it conceivable, says Hagen, that one or more of Amenhotep III’s non-Egyptian wives also lived there. “There we have a genuine example of a foreign princess married to the Egyptian pharaoh living in the palace,” says Hagen. “I don’t think it is unreasonable to assume that this is representative and typical.”

It would be notable to find that those buried in KV40 lived at the Gurob palace, Bickel says, given how far it is from the Valley of the Kings. “If these people lived in Memphis, it would be astonishing that they were brought to rest in Thebes, every single one of them embalmed and then sent hundreds of miles upstream with all their funerary materials,” she says. “It is possible, but it would be an interesting piece of information.”

The Malkata palace in Thebes, called the “Palace of the Dazzling Orb and the House of Rejoicing,” was built in preparation for Amenhotep III’s first jubilee, which was celebrated during the 30th year of his reign. The massive structure, which measured nearly a mile end to end, is thought to have been inhabited by the king only occasionally during festivals, but Bickel wonders whether some members of the royal court might have stayed there year-round. “It is so huge that nothing would speak against people living there permanently,” she says. “If these families were really very, very large, would everyone travel or would women stay behind? We have no direct information on life at the royal court.”

THIS LACK OF INFORMATION about members of the royal court beyond the pharaoh and his great royal wife is what makes Bickel’s finds in KV40 so significant. The closest parallel is a somewhat obscure tomb in Sheikh Abd el-Gurna, just east of the Valley of the Kings. The heavily looted tomb, which may have borne the seal of Amenhotep III, was discovered in 1857 by Scottish Egyptologist Alexander Henry Rhind.

Inside the tomb, Rhind found a cache of mummies along with inscriptions on wooden tablets identifying those buried there as king’s daughters, including two probable sisters of Amenhotep III, Tiaa and Py-ih. In addition, several of those buried in the tomb were identified as belonging to the “House of the Royal Children,” which was also mentioned in the inscriptions for some of the king’s daughters found in KV40. Bickel suggests that the House of the Royal Children was an institution that owned land and other wealth-producing



KV40 was used for burials during two distinct periods in ancient Egyptian history. The wooden coffin fragment (top) is from a 22nd Dynasty burial, and this piece of a mummy case (bottom) is thought to be from an 18th Dynasty burial.

resources that supported children of the king throughout their lives. “They were not just living in the palace and fed by the palace, they had more or less their own salary,” she says. “So would these women be more important? Would these be adults who had a fixed income and the others would be children or younger ones? It’s hard to say.”

Some questions raised by Bickel’s finds at KV40 may be answered through anthropological and isotopic analysis, but many more will remain. Still, the find has furthered our understanding of who—other than the pharaohs themselves—got to be buried in the Valley of the Kings during the 18th Dynasty. It seems to suggest, for example, that one’s social and familial ties to the king were more important in gaining entry than was one’s position in the state bureaucracy. “One hypothesis has been that the highest strata of officials might be buried in the Valley of the Kings,” says Bickel. “But what we find is more and more people from the royal sphere. This might change, but for the time being, it strengthens the evidence for the presence of the king’s family in the Valley of the Kings.” ■

Daniel Weiss is a senior editor at *ARCHAEOLOGY*.

SHIPWRECK



CK ALLEY

DEFIANCE

Vessel type: Wooden two-masted schooner

Length: 115 feet

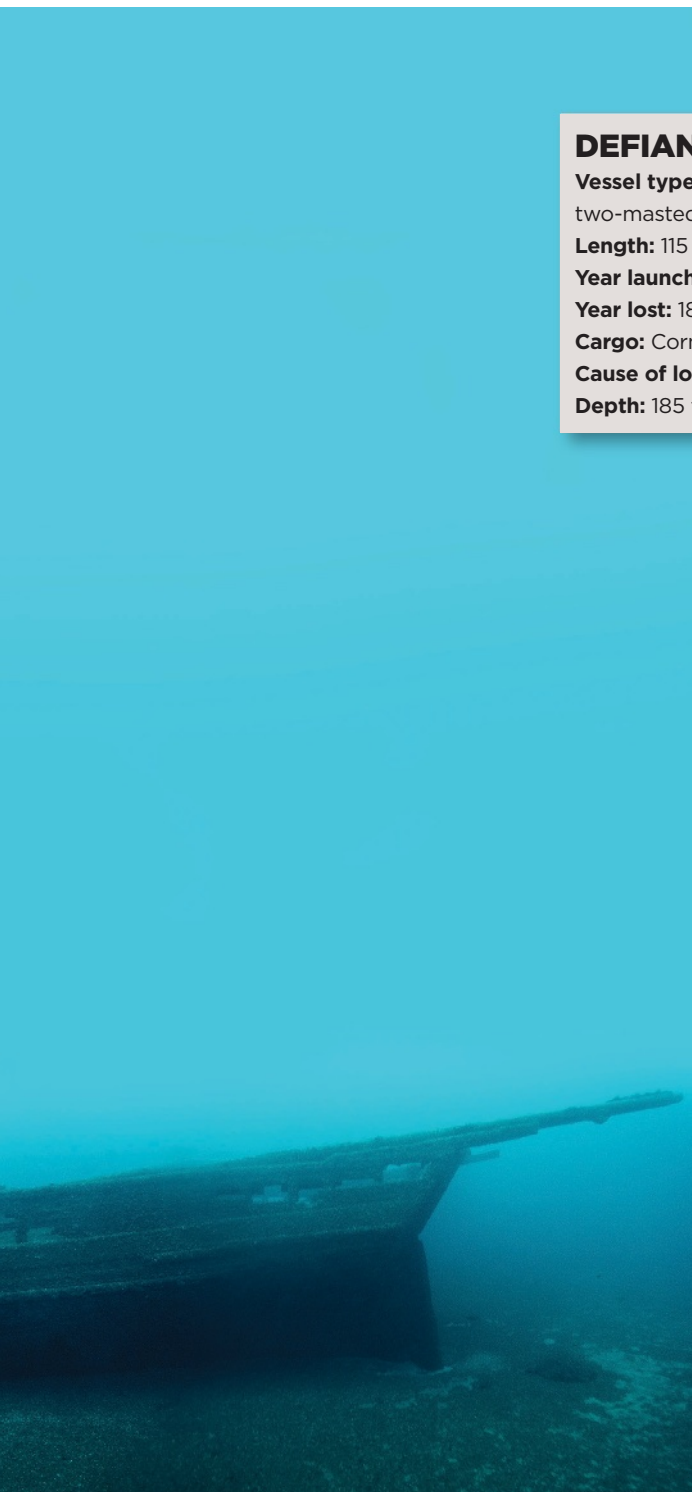
Year launched: 1848

Year lost: 1854

Cargo: Corn and wheat

Cause of loss: Collision

Depth: 185 feet



From wood to steel, from sail to steam, from early pioneers to established industry, the history of the Great Lakes can be found deep beneath Thunder Bay

by SAMIR S. PATEL

THREE MEN ARE SITTING on the aft deck of RV *Storm*, a 50-foot research vessel bobbing gently on Lake Huron on a clear, warm July morning. They've more or less disappeared under shrouds of black neoprene, masses of corrugated and smooth tubes, and constellations of metal tanks, clips, and fasteners. Dive safety officer Jason Nunn calls out a checklist that sounds arcane even to an experienced scuba diver:

"Press the ADV to ensure proper operation."

"Confirm computers are set for CCR mode and that you're on the appropriate mix."

"Set your PO₂ to 0.5."

Defiance emerged from a dense fog in the early morning hours to an unexpected sight: *John J. Audubon*, one of a fleet of new, fast sailing ships, closing in. Because of its speed and the tight Lake Huron sailing lanes, *Audubon* couldn't avoid a collision. The ships ultimately sank within miles of each other, but no lives were lost.

The divers—Russ Green, Joe Hoyt, and Tane Casserley—are underwater archaeologists with the Office of National Marine Sanctuaries of the National Oceanic and Atmospheric Administration (NOAA). They are wearing rebreather systems that scrub the carbon dioxide from their breath and recycle the air, allowing them to dive deeper and stay down longer than divers with traditional open-circuit scuba gear. In a few minutes, they will drop 165 feet through the clear, cold water to the wreck of *Pewabic*, a 200-foot-long freighter that sank in 1865 after a mysterious collision. *Pewabic* is one of hundreds of wrecks and suspected wrecks in the Thunder Bay National Marine Sanctuary off the northeast coast of Michigan. Together, these historic ships embody the entire history of modern transportation in the Great Lakes—the story of the opening of the American continent to settlement and industry.

“About 30 seconds to rail,” says Nunn, who is from East Carolina University, cueing the divers to approach the edge of the deck.

“I’ve been waiting all day for this moment,” says Hoyt, visiting Thunder Bay from the Monitor National Marine Sanctuary in Virginia, before he lumbers over. One after another, the divers step out and disappear.

Twenty-five minutes later, an inflatable bag surfaces a few yards from *Storm*. This is the signal to Nunn that the divers are all together, and the prompt for him to send out two safety divers—NOAA archaeologist Stephanie Gandulla and East Carolina University’s Mark Keusenkothen. A second bag pops up to signal that everything is okay and the divers are waiting 60 feet below for safety purposes.

“Business as usual,” says Casserley around 20 minutes later as he hauls himself back onto the deck, with no little effort, and begins the laborious process of removing his equipment.

TO PREPARE TO DIVE Lake Huron, even in the middle of July, is to set up defenses against the cold. Divers must don either dry suits like the ones the archaeologists wear or 7 mm wetsuits, thick and constricting enough to make raising one’s arms a chore. Casserley, who was used to diving in Hawaii, says it took him five years to get comfortable with diving these northern waters. “If it weren’t for all these wrecks...,” he says, trailing off and looking out over the lake. At depth, the water temperature can be just 36 degrees Fahrenheit. It slides down the back of one’s wetsuit like an ice cube. But that cold freshwater is the reason there is a sanctuary here. The conditions are amazing for the preservation of shipwrecks.

In the salty ocean, wooden wrecks typically get eaten away by shipworm and metal ones by rust, so they rarely *look* like ships anymore (with exceptions, such as the *Vasa* in the cold Baltic). But Lake Huron keeps them remarkably intact. Take *Defiance* and *John J. Audubon*, which collided and sank in 1854. Each sits upright on the lake floor, and both of *Defiance*’s masts are intact, rising more than 70 feet from the deck. Even encrusted in sea life, they look like they could have gone down yesterday.

“It’s a little overwhelming when a boat is intact on the

bottom,” says Wayne Lusardi, underwater archaeologist for the state of Michigan, which comanages the sanctuary. Away from surface waves, scouring ice, and recreational divers, the deepest wrecks stay in good condition. As he puts it, “They stay lost longer.”

And many, many boats were lost in this part of Lake Huron.

THE GREAT LAKES—Ontario, Erie, Huron, Michigan, and Superior—formed around 10,000 years ago as retreating glaciers filled vast basins with meltwater. Together they make up the largest lake system in the world by surface area and hold one-fifth of the world’s surface freshwater. Before European colonization, Native Americans used the lakes for trade and communication. Later, colonial ships sailed their waters sporadically, followed by military vessels during the War of 1812. With the 1825 opening of the 363-mile-long Erie Canal, which connected the Hudson River with Lake Erie, shipping on the lakes began to grow rapidly. Throughout the nineteenth century, canals and locks were built to connect the lakes with each other (and the Mississippi River) and to bypass rapids and falls (including at Niagara). This made the transportation of people and bulk goods from the Atlantic coast to the interior safer and faster than ever before, at a time when the U.S. rail system was in its infancy.

At first, these ships carried pioneers and package freight to and around the Midwest. Coal came up the system from Pennsylvania, grain from Minnesota and Wisconsin. Ore traveled down to Cleveland, Buffalo, and Detroit, and people and freight found passage to Chicago and points west. By the 1870s, 3,000 Great Lakes ships were registered in the United States, and another 1,000 in Canada. Over time, ornate sailing ships gave way to boxy, utilitarian schooners. Sail gave way to steam, and wood to steel.

Thunder Bay, in northern Lake Huron, is in the middle of the Great Lakes waterway system, and so it sees the full range of passengers and cargo. “Everything that’s important,” says Green, “is coming by Thunder Bay.” That means traffic—and the congestion is exacerbated because Thunder Bay lies near a choke point. Ships traveling north through Lake Huron must make a sharp turn west to pass through the Straits of Mackinac into Lake Michigan. In an effort to save time and cut costs, captains often tried to cut this corner. Before shipping lanes were firmly established, a lot of ships’ paths converged in a small area. In addition, there are a number of navigational hazards and—as any Great Lakes native can attest—sudden, nasty storms. “They don’t call it ‘Thunder Bay’ for nothing,” says Lusardi. A single storm in 1913—known as the “White Hurricane”—claimed 12 ships and 248 lives. These ships were trying to make the last late-season runs before the lakes iced up. Some 60 to 70 percent of the ships lost near Thunder Bay went down in such early-winter rushes.

“It’s pretty amazing what lies beneath the lakes,” says Lusardi. “Most people have no idea how big the lakes are and how ferocious they can be and how they can just swallow things up.”

The oldest documented wreck in Thunder Bay is a wooden

At least 35 passengers and crew died when *Pewabic* sank after cutting across the path of its sister ship, *Meteor*. It is the deadliest maritime accident in Thunder Bay history.

PEWABIC

Vessel type: Wooden twin-screw passenger/package freighter
Length: 200 feet
Year launched: 1863
Year lost: 1865
Cargo: Copper and iron ore, passengers
Cause of loss: Collision
Depth: 165 feet

NEW ORLEANS

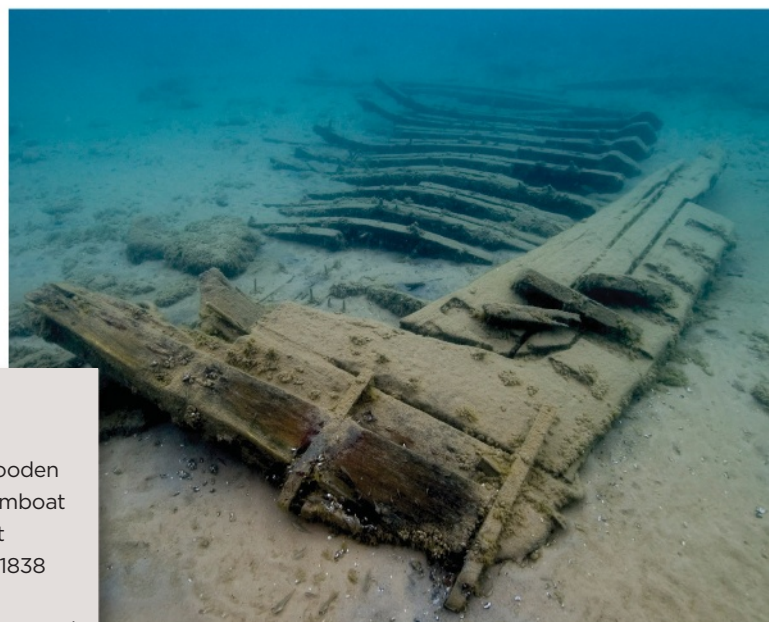
Vessel type: Wooden side-wheel steamboat
Length: 165 feet
Year launched: 1838
Year lost: 1849
Cargo: Passengers and freight
Cause of loss: Ran aground
Depth: 13 feet

NORDMEER

Vessel type: Steel ocean freighter
Length: 471 feet
Year launched: 1954
Year lost: 1966
Cargo: Rolled steel
Cause of loss: Ran aground
Depth: 40 feet



Unlike most of the other wrecks in Thunder Bay, *Nordmeer*, the most recent, was an oceangoing vessel that had circumnavigated Africa twice. Portions of the hull were exposed—and visited by the curious—for 45 years after the wreck. Years of storms and ice have greatly claimed the portion that once stood out of the water.



New Orleans began life as *Vermillion*, a 151-foot steamer that burned to the waterline in 1842. The ship was salvaged and expanded in 1844, and its regular route passed Thunder Bay four times a month.

MONTANA

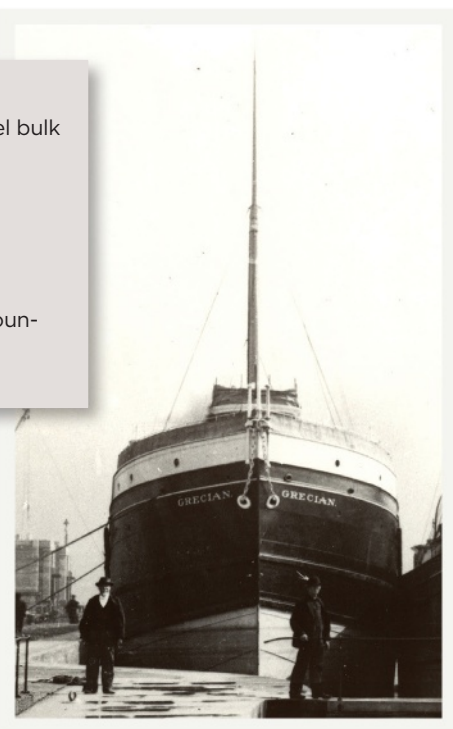
Vessel type: Wooden steam barge
Length: 236 feet
Year built: 1872
Year lost: 1914
Cargo: None
Cause of loss: Fire
Depth: 65 feet

After 30 years of carrying passengers and freight, *Montana* was altered to carry massive amounts of lumber. Its upper deck and cabins having been removed, the ship could carry a million board feet in a load, but was empty when a fire sank it.

GRECIAN

Vessel type: Steel bulk freighter
Length: 296 feet
Year built: 1891
Year lost: 1906
Cargo: None
Cause of loss: Foundered
Depth: 100 feet

Among the earliest steel ships on the Great Lakes, *Grecian* hauled iron ore for the U.S. Steel Corporation. But the steel of its own hull was brittle, so a reef collision cracked it open, and the ship sank near Thunder Bay as it was being towed for repairs.



Isaac M. Scott sank during the “White Hurricane” of November 1913, when two major storm fronts converged, creating 35-foot waves and 90-mile-per-hour wind gusts. Twelve ships sank and 31 more were driven ashore.



ISAAC M. SCOTT

Vessel type: Steel bulk freighter
Length: 504 feet
Year launched: 1909
Year lost: 1913
Cargo: Coal
Cause of loss: Storm
Depth: 175 feet

side-wheel steamboat called *New Orleans* that ran aground in 1849. The last ship to be swallowed up by these waters was *Nordmeer*, a 471-foot-long oceangoing German freighter, in 1966. Just 14 years later, Thunder Bay became a state underwater preserve. In 2000 it was designated a 448-square-mile National Marine Sanctuary, and in September 2014, the sanctuary grew almost 10 times in size to 4,300 square miles. The original sanctuary contained 45 known wrecks and 40 suspected ones. The new boundaries add 47 known and 60 suspected wrecks to those totals, many of which are in deeper water. Wrecks are still being found and identified.

THE NOAA ARCHAEOLOGISTS have peeled themselves out of their gear and munch on apples and granola bars while *Storm* putters to another wreck site. They can afford to take their time, as they have a two-hour surface interval before they can dive again. They're discussing wrecks, as they always do, the way one talks about old friends, each with its own long story of life as both ship and wreck. There are too many wrecks, especially in deep water, to study them all in detail, and the field season is short. So the archaeologists focus on documentation and monitoring. On *Pewabic*, they worked to create a photomosaic—probably their most common tool—of the entire wreck that will allow them to both examine details and assess how the site has changed over time.

Pewabic ran from Cleveland to Lake Superior and back, carrying passengers and ore. The ship was passing Thunder Bay in 1865 with a load of copper and iron, when it steamed close enough to its sister ship, *Meteor*, to pass mail and news, as ships often did. For an unknown reason, *Pewabic* cut suddenly across *Meteor*'s path, and the collision left a gaping hole in its port bow. *Pewabic* sank in minutes, killing at least 35 passengers and crewmen. Over the years, several attempts were made to retrieve its valuable cargo of 1,000 tons of copper ore. But it wasn't until 1917, during World War I, that salvagers using a bucket crane were able to extract 80 percent of the copper on board, destroying the ship's cabins but leaving the hull intact.

Phil Hartmeyer researched *Pewabic* for his thesis in maritime studies at East Carolina University and now is on staff at Thunder Bay. The NOAA archaeologists examine and document wrecks and then make them available for more in-depth work. "By bringing other people into the research, we can compound the value of the work we do," says Jeff Gray, superintendent of the sanctuary.

The NOAA team and their partners examine how ships changed over time, which was not always documented in any detail. Great Lakes ships, not subject to the battering that oceangoing vessels endure, might last 70 years, during which time they may be altered or repurposed multiple times. This was the case with *Montana*, another ship that the team has examined and is mapping in detail by hand. When it was built in 1872, *Montana* was a package freighter with relatively luxurious passenger cabins on top. Over the years, the cabins were removed, which allowed the ship to carry great stacks of lumber on its lower deck. The ship that sank after a fire in 1914 hardly resembled the original.

The ships evolved while they were in use, and have continued to change since becoming wrecks. For most sites, especially those in deep water, where dive time is heavily restricted, monitoring this change is as much as the archaeologists can do. "There are just too many wrecks here and you have to prioritize," says Lusardi. "The summers are short and it takes a lot to mobilize."

Though the wrecks remain well preserved, Lake Huron is a dynamic environment, and the last decade or so has seen sweeping ecological changes in the Great Lakes. The St. Lawrence Seaway, which connects the Great Lakes to the Atlantic via Montreal, opened in 1959 and provides lake access to deep-draft oceangoing vessels. These ships brought stowaways: In the late 1980s, zebra mussels, small aquatic invertebrates native to Russian lakes, were first spotted in the Great Lakes. They have since become an invasive species, encrusting hard surfaces and damaging lakeside infrastructure. By the 1990s, they had spread around the Great Lakes and American rivers, including at Thunder Bay. The mollusks are filter feeders, and for a little while they cleared up the water column and provided divers and archaeologists with great visibility. "That was really a magic moment for documenting deep-water wrecks," says Green. But they also began to cling to the shipwrecks. Within a few years, the zebra mussels in Thunder Bay were outcompeted by another invasive species, the larger quagga mussel, native to Ukraine, that now seems to completely blanket the wrecks in the sanctuary. The seemingly positive effect on water visibility was short-lived. The clearer water they created allows sunlight to penetrate deeper, where it feeds algal growth, depending on the season. Some wrecks now sport shaggy beards of algae in the summer, further obscuring details and artifacts. Many of the wrecks the archaeologists have looked at recently were last examined and photographed in 2005, when mussels were present but not pervasive.

"We're pretty shocked at the mussel growth in nine years on some of these sites," says Green. It does not appear that the mussels do a lot of damage to the wrecks underneath (though their weight could be a concern at some sites), but they do impair the ability to learn more. "They obscure everything," Green explains. "The information is still there, so what do you do? Wait them out? They're not going anywhere."

There are any number of historically significant wrecks in the new, expanded sanctuary that haven't been identified, photographed, or studied yet. Some of those, especially in deep water, could have huge archaeological potential. Hence the archaeologists' training and practice with rebreathers and, in the future, other advanced diving techniques. The need to go deeper and the abundance of wrecks leave this group of researchers—as they prepare to drop in for a visit to an unknown wreck that might be *Corsair*, a classic schooner wrecked in 1872—with an enviable problem: so many wrecks, so little time. ■

Samir S. Patel is deputy editor at ARCHAEOLOGY.

For more photos and video of the wrecks of Thunder Bay, go to www.archaeology.org/thunderbay





Archaeologists in Lower Normandy have recently uncovered a large, enclosed cemetery with hundreds of graves dating from the mid-4th to the end of the 7th century A.D. The cemetery was found largely intact and undisturbed, with the exception of the two bomb craters (top left and bottom right), made in 1944, that damaged several graves.

Gaul After the Romans

A cemetery in northwestern France is beginning to expand our knowledge of the emergence of the Merovingian dynasty

by JARRETT A. LOBELL

WHEN AMINTE THOMANN of the French National Institute of Preventive Archaeological Research (INRAP) began work at Saint-Aubin-des-Champs in the commune of Évrecy in summer 2014, she could have had no idea that she and her team would uncover nearly 400 graves in only four months of excavation. The graves date to between the middle of the fourth and the end of the seventh centuries, a period of tremendous political, social, and religious change. Beginning with the defeat of the Visigoths, Saxons, and Alemanni by the Frankish king Childeric I in the middle of the fifth century, a new dynasty called the Merovingians laid claim to a large territory that had been the Roman Empire's provinces of Gaul, Raetia, Germania Superior, and part of Germania Magna.

The Merovingians, named after Childeric's father Merovech, ruled for nearly 300 years, until A.D. 752, when the last Merovingian monarch, Childeric III, was replaced by Pepin the Short, the first king of the Carolingian dynasty. It was Childeric I's son Clovis I who converted to Christianity and set the stage for the unification of almost all of Gaul under Merovingian rule. But despite the strength and longevity of their kingdom, very few early Merovingian sites have been excavated, especially in this region of France. And none are nearly as complete as the cemetery in Évrecy, or filled with as many remarkable grave goods. "As you can imagine, this was a very exciting dig," says Thomann. "It was the possibility of excavating a whole cemetery that was so interesting. We knew right away that we were working on a site that will become a reference point for this particular period in northern France."

Until the INRAP team began their work, this cemetery was unknown. It was a "complete surprise," says Thomann. It had never been mentioned or recorded either by nineteenth-century archaeologists or by local farmers, and the area has



Many of the wealthier burials, most of which date to the cemetery's earlier phases, contained impressive grave goods (top), including glass, ceramic, and bronze vessels and jewelry. These trumpet-shaped pins (above), a style popular in Germany, would have been fastened at the shoulder, and provide evidence that some of the burials may have belonged to foreign residents of the village.

been built up in recent years. Preliminary results of the dig have shown that the cemetery likely belonged to a nearby village. In the 393 graves that have been excavated are remains of both male and female adults and children, representing a sample of all the village's inhabitants. Although work on the skeletons has just begun, Thomann hopes that further study will illuminate aspects of the villagers' diet, health, and sanitary conditions, and possibly their origins as well.

THERE IS A GREAT DEAL that can be learned from the variety of grave goods the team has unearthed, the number and quality of which weren't suggested by the examination of the first two graves in the early stages of the dig, says Thomann. The site has produced an impressive array of artifacts: weapons, toiletries, jewels, tableware, and more. Though the artifacts are found in graves from each period, the richer graves date from the middle of the fourth and fifth centuries, at the very end of the Roman Empire. Several may even have belonged to members of a nonindigenous military elite, as some excavated beads may have come from Asia and trumpet-shaped pins are Germanic in style. Such artifacts contrast with the more modest ones of the local population.

"It is also interesting that in some of the fifth-century graves there are older pots that were incised with crosses after they were fired and had been used," says Thomann. "We believe this is a sign of the Christianization of at least part of the population at the end of late antiquity. Even if the material and funerary practices are Roman, there are already some visible signs of Christianity showing that beliefs are beginning to change."

FOR ARCHAEOLOGISTS, burial practices are one of the purest expressions of a culture. An undisturbed grave offers the chance to place oneself in the very moment an ancient event took place. The discovery of a single grave can change our understanding of a site, but to uncover a complete cemetery can change our understanding of an entire people. For a period such as the transition from the Roman Empire to the Merovingian dynasty, when the entire social, religious, and cultural fabric was changing, a site such as the cemetery at Évrecy is of inestimable value. "We already know that, at the end of the study, we will have more questions than answers. And that is why we do this job," says Thomann. "But the knowledge this site will bring to this relatively unknown time will help us understand the history of both this region and far beyond." ■

Jarrett A. Lobell is executive editor at *ARCHAEOLOGY*.

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Storied Landscape

Through centuries—and perhaps even millennia—of cultural, political, and environmental change, Phnom Kulen has retained its central role in the spiritual life of a people

by KAREN COATES



The ruins of an Angkor-era temple on Phnom Kulen remain a popular destination for both pilgrims and tourists.

Northeast of the inland Cambodian city of Siem Reap, far from the crush of the morning traffic, noisy market stalls, and mobs of motorbikes stopping for noodle soup and chicken rice, an imposing plateau rises from the hot, flat land. Phnom Kulen, the “Mountain of Lychees,” reaches 1,500 feet high, stretches 15 miles long, and is nine miles wide at its broadest point. It is a rippled mountain range of

thick forests and fields and streams that tumble downhill through its rocky ravines.

For millennia, Phnom Kulen has been sacred to the Khmer, the dominant ethnic group in this country both in antiquity and today. Throughout its long history, people have gone there to live and work, to worship and celebrate, and to seek solace and refuge. Kings and soldiers, Hindus and Buddhists, pilgrims and hermits, have

all gone to Phnom Kulen. There, in A.D. 802, Jayavarman II declared himself *devaraja*, or “god king,” of a united Khmer state. And there he founded Mahendraparvata, the capital city of what would become the vast Angkor Empire that flourished between the ninth and fifteenth centuries. At its height, the empire controlled territories in what are now modern-day Cambodia, parts of Thailand and Laos, and beyond.



A woman sells Buddhist offerings on the staircase leading to the Preah Ang Thom temple atop Phnom Kulen.

Phnom Kulen's exceptional and enduring place in Cambodian life and history is, in great measure, thanks to water. It accumulates in the mountain's porous sandstone and is released year-round into innumerable sacred pools and rivers, and into the springs and streams that once supplied the Angkor Empire, and today still feed the paddies that produce the majority of the region's daily rice. In this way, Phnom Kulen is tied inexorably not only to the Angkor-era civilization of the past, but to modern-day Cambodia. Hundreds of generations have gone there and have left behind a record in the form of remarkable sculptures, carvings, and paintings, some of which are just now being discovered and researched. "Mountains are always



A golden statue of a reclining Buddha lies in the temple of Preah Ang Thom.

closer to the gods," says archaeologist Jean-Baptiste Chevance. "They have always been in many civilizations, many cultures, a sacred place. This is one such place."

Sunlight streams across the plateau as we approach the base of Phnom Kulen. It's the week of Khmer New Year, the biggest holiday of the year, and thousands of pilgrims



The sandstone bedrock of the River of a Thousand Lingas is covered in carved representations of the power of the Hindu god Shiva.

and partiers from across the country are convening at the mountain to celebrate. Bumper-to-bumper traffic crawls up a winding, one-lane paved road through thick forests filled with noisy cicadas that compete with the human din. Every now and then, the trees give way to expansive vistas of the plains below. I can see how this vantage point would have given Khmer sentries, or much later Khmer Rouge fighters who dug in here, clear views of approaching threats.

The paved road ends in a wide, flat, rocky area near a staircase leading to Preah Ang Thom, a sixteenth-century monastery with a golden sculpture of a giant reclining Buddha. As people prepare to observe the New Year, the landscape is a hive of activity.

The air is fragrant with incense and lotus, music blares from loudspeakers, and vendors sell trinkets, hats, sarongs, fried fish, cold drinks, and traditional medicine. Beggars line the stairs as pilgrims drop small amounts of money into their hats—helping the poor is a traditional part of Buddhist celebrations. The Buddha room, high in a tower accessible only by steep steps, is dense with people who come to pray—and then photograph themselves on their cell phones. This happens all week long throughout the New Year festivities.

Nearby, crowds gather in the waters of the River of a Thousand Lingas, where the riverbed is covered in carved symbols of the power of the Hindu god Shiva. Children slide

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downriver on their hands, shrieking happily. A woman holds her nose and reclines, submerging her head in the refreshing flow. Along the river's banks, families gather on mats spread across the leafy ground, digging into soup tureens and stir-fry pans.

On another day during the New Year celebrations, I return to the mountain to explore sites higher up, away from all the holiday noise. Not far from the golden Buddha, we find motorcycle taxis for hire, and six of us—me; my driver, Rathana; my husband, Jerry, with his driver, Kang; and our translator, Visal, with his driver, Chieng—begin the ascent. The crowds of pilgrims and picnickers give way to quiet forest as we climb a dirt road, broken by rocky, sandy open areas, through the trees. Here, atop Phnom Kulen, a few small communities are scattered across the remote terrain and villagers live today much as their ancestors did. My right hand blisters from gripping the motorcycle seat as Rathana and I careen along the bumpy, jerky route. Following a narrow, root-strewn path, we duck to avoid branches and lean hard into the curves. Rathana is a good driver, but this isn't a good trail.

I am more concerned, however, about land mines. Locals have told me that they are plentiful, left over from years of civil war when the Khmer Rouge controlled Phnom Kulen. The Cambodian Mine Action Centre, the country's leading mine clearance organization, works with archaeological teams in the area and has cleared a few main paths and



Red and white paint signifies that a path near the carvings at Srah Damrei has been cleared of land mines.



Prehistorian Heng Than walks through burned fields (top) on his way to the rock art site of Poeung Komnou. Than points out (above) faint monochrome paintings of a catfish and a geometric design that pre-date the Angkor era.

sites. Chevance, who founded the Archaeology and Development Fund in 2008 to foster archaeological research and conservation on Phnom Kulen, and with whom I spoke after my visit, says that villages and ancient sites, especially if they contain water, were often mined because they were likely places for soldiers to occupy. "We can't clear the whole mountain of mines. It's impossible," Chevance says. "But we never go into a place local people say is mined. That would be suicide."

After a 20-minute ride, we stop the bikes and hike to the demined site of Srah Damrei, where large Angkor-era stone elephant and lion statues guard a small pond. The drivers light cigarettes and chat, resting on nearby boulders. They know it as a sacred place where locals come to pray. I peer into a puddle filled with just a few inches of water and plenty of silt, and Chieng says, "Before, there was freshwater, so it was called *srah*, or 'pool.'"

We linger a few minutes, enjoying the cool, shady forest. It's an hour

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An Angkor-era elephant statue stands near a sacred pool at the site of Srah Damrei.

past lunch, and we're hungry, but on the way back to Preah Ang Thom there is nothing to eat. There are no restaurants, no guesthouses, and few people with food to spare. A village we pass through has only a few scattered thatch and wood huts built on stilts. Life is difficult for Phnom Kulen's inhabitants. Most villagers are slash-and-burn subsistence farmers, and in recent years many plots of land have been converted to cashew plantations. The jungle is disappearing at an alarming rate. "You have 4,000 people now, and most of them are struggling," Chevance later tells me. "The roads are very bad. In the rainy season they turn into rivers. There is a lot of malnourishment. Even if it's two hours from Siem Reap, it's still very poor."

At the crack of dawn, Jerry and I head by taxi to the base of a prominent escarpment that forms the south-east edge of Phnom Kulen to see yet one more aspect of it. Our guide is Heng Than, a prehistorian who works with the APSARA Authority, which manages the temples and surrounding area. The car rumbles down a flat red-dirt road amid fields just starting to turn green. Ponds glisten after an early morning rain. "Right now is the short



More than 15 Angkor-era carvings depicting Hindu deities and other figures are carved into a giant sandstone boulder at Poeung Komnou.

rainy season," Heng says. The full rainy season is still a month away. We are planning to hike to the rock shelter of Poeung Komnou, a site where a recluse named Sivasoma lived in A.D. 1074 and where, ever since, he has been worshiped as a local spirit and the guardian of the mountain. On this side of Phnom Kulen there are at least

10, and possibly more, rock art sites that researchers believe might pre-date the Angkor era by thousands of years, some just steps away from Angkor-era carvings among the same rocks. We park in a field and get under way.

The ground is sandy and covered in scrub. "A few years ago there were very, very big trees," Heng says. But, he explains, they're gone now, a casualty of the rampant logging and agricultural expansion overtaking the mountain. Not far up the trail, we meet a banana farmer named Yao Yam. Yao, who was born on this eastern side of Phnom Kulen, tells us that when he and his neighbors need water for their rice fields, they hold a special ceremony honoring the mountain spirits. Yao knows this place has held meaning for many generations before him. "When I was young," Yao

says, "my father told me there were drawings on the rock shelter." Yao suspects this mountain might have concealed soldiers during the Angkor Empire, just as it did during the recent civil war, and he thinks those earlier soldiers might have been the ones who painted the rocks while hiding out.

We continue uphill, with Heng

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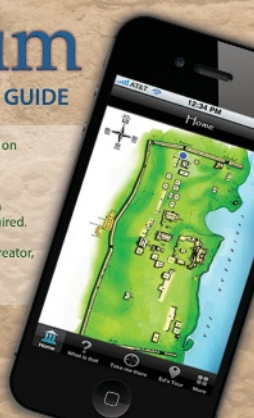
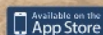
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guiding at a fast clip, through an area recently cleared of trees and burned for agriculture. It's a hot, dry walk along a gently sloping path, scented with flowers and speckled with butterflies. We hear a chainsaw up the mountain, and Heng cringes. Next we walk through a blackened field and past a few wooden dwellings. A little farther on, suddenly, there is a

or even older. This would push the mountain's record of human occupation much deeper into history.

Heng first visited Poeung Komnou and saw the Angkor carvings more than a dozen years ago, but tells me that initially he hadn't noticed the paintings just around the other side of the boulder. "I had no idea about the rock art," he says. Although locals

according to Tan, these sandstone boulders might yet say a great deal about the people who pre-date the Angkor Empire. Researchers think the early painters lived in many of the rock shelters they decorated, but aren't sure yet whether these were permanent or seasonal habitation sites.

The boulder, situated as it is, has one of its surfaces quite close to



At Poeung Komnou, a Buddhist monk walks between carvings of the gods Ganesha and Vishnu.

giant boulder with one side forming an overhang protecting a rock face. On it I can make out a few faint red zigzag lines and a large depiction of a catfish. According to Noel Hidalgo Tan, a specialist in archaeology at the Southeast Asian Ministers of Education Organization's Regional Centre for Archaeology and Fine Arts in Bangkok, there's a good chance that these paintings are prehistoric, or at least pre-Angkor, with some possibly being as much as 3,000 years old,

such as Yao have long known about the images, researchers weren't aware of them until just a few years ago, when villagers pointed them out. The Living Angkor Road Project, a joint Thai-Khmer research effort aimed at identifying Angkor Empire roads, has now begun to investigate the paintings here. The study of rock art is a relatively new field of research in Cambodia. "It's still just the beginning," Heng says. Although right now the archaeology is still unclear,

another massive rock. On that face, a striking Angkor-era carving of the Hindu god Vishnu reclining on his side appears to look at an equally remarkable carving of the elephant-god, Ganesha, across the gap. I tiptoe through the passage to the other side of the boulder. Taking a few steps more and rounding the corner, I am amazed at the sight on the other side—more startling Angkor carvings of Hindu deities with meditating ascetics at their feet.

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Of Interest to All

7. Freer-Sackler Gallery *Unearthing Arabia: The Archaeological Adventures of Wendell Phillips*, opened October 11, 2014, and on view through June 7, 2015, at the Arthur M. Sackler Gallery, explores a massive expedition to Yemen headed by Wendell Phillips between 1949 and 1952. www.asia.si.edu/unearthingarabia

8. Mayan Calendar This 2015 edition of the Mayan Calendar includes the symbols representing the day name in the Mayan Sacred and Solar calendars for every day of the year, the

Long Count for the first day of every month, and factoids about important dates in Maya history. Proceeds support Maya Exploration Center, a non-profit research and education center. www.mayan-calendar.com, **p.59**

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11. Archaeological Institute of America Join the oldest and largest society devoted to the study and preservation of the record of the human past. www.archaeological.org

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As Heng, Jerry, and I make our way back to Siem Reap, we pass a couple on the road-side carving wooden logs a foot in diameter and 20 feet long, to be used as house pillars. Heng explains that the tools the couple are using are modeled on Stone Age and Iron Age designs. One is an ax called a *pu tau*, and the other is a *dung*, a metal wedge blade on a crescent-shaped wooden head attached to a wooden handle. For more than a thousand years, inhabitants of Phnom Kulen have been using implements like these to cut down trees and, when turned another way, to smooth the wood.

An old quarry in a shallow stream just down the road tells a similar story. Looking closely, I can see grooves, likely Angkor-era, cut two inches into stone amid scratches made by modern villagers' knives. Locals still sharpen their tools on the rock's surface here. Their tools, like Phnom Kulen itself, are a living link to the past.

Once back in town, I recall a woman I met at Poeung Komnou, something of a recluse like Sivasoma centuries before her. Her name is Nyap, and as she stood beside the Angkor-era carvings, examining and



A young man uses a tool called a *dung* (top) to strip bark from a tree. A stone quarry, possibly of the Angkor period, sits at the base of Phnom Kulen.



A local woman named Nyap stands beneath Angkor-era carvings of Hindu gods at Poeung Komnou. She lives in a hut a few hundred yards away.

pointing to the intricate details in the images of deities, she began to recount her long journey to Phnom Kulen. Just back from the forest, Nyap held a blade in one hand, a basket in the other, a checkered *krama* scarf tucked under her arm. She led me to her outdoor cooking area, just a short walk from the carvings. As she squatted to the ground and lit a wood cooking fire beneath her pot of rice, she told me she rarely has enough to eat, but that she is at peace now. She had been sick and alone at home in

a distant province when she awoke from a dream, knowing this mountain would heal her. "God pushed me to come to this place," Nyap said. "When I came here everything inside my body was changed." ■

Karen Coates is a senior fellow at the Schuster Institute for Investigative Journalism and the author of *Eternal Harvest: The Legacy of American Bombs in Laos*. For video of the author's trip to Phnom Kulen go to www.archaeology.org/cambodia

Doctor *Designed.* Audiologist *Tested.* FDA *Registered.*

Affordable *New* Digital Hearing Aid *Outperforms* Expensive Competitors Delivers *Crystal -Clear* Natural Sound

Reported by J. Page

Chicago: Board-certified physician Dr. S. Cherukuri has done it once again with his newest invention of a medical grade ALL DIGITAL affordable hearing aid.

This new digital hearing aid is packed with all the features of \$3,000 competitors at a mere fraction of the cost. Now, most people with hearing loss are able to enjoy crystal clear, natural sound—in a crowd, on the phone, in the wind—without suffering through “whistling” and annoying background noise.

After years of extensive research, Dr. Cherukuri has now created a **state-of-the-art** digital hearing aid that's packed with the features of those expensive \$3,000 competitors — at a **fraction of the price.**

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This sleek, lightweight, fully programmed hearing aid is the outgrowth of the digital revolution that is changing our world. While demand for “all things digital” caused most prices to plunge (consider DVD players and computers, which originally sold for thousands of dollars and today can be purchased at a fraction of that price), yet the cost of a digital medical hearing aid remained out of reach.

Dr. Cherukuri knew that many of his patients would benefit but couldn't afford the expense of these new digital hearing aids. Generally they are not covered by Medicare and most private health insurance.

The doctor evaluated all the high priced digital hearing aids on the market, broke them down to their base components, and then created his own affordable version—called the **MDHearingAid® AIR** for its virtually invisible, lightweight appearance.

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International Archaeology Day Continues Rapid Growth with Almost 500 Events in 2014



Basket-making in New Mexico



Site visit in Czech Republic



Children's art competition in Florida



Archaeology fair in Belize

National Park Service, the National Marine Sanctuaries program, the Council for British Archaeology, the J. Paul Getty Museum, and the Uffizi Gallery, joined the AIA to mark IAD. Visit www.archaeologyday.org to see a complete list of 2014 Collaborating

IN THE FOUR YEARS since its inauguration, International Archaeology Day (IAD) has grown so rapidly both nationally and globally that the number of events and participants has more than quadrupled. In 2011, the first IAD featured 115 events, attended by approximately 15,000 people in three countries. In 2014, there were almost 500 events around the world. Since 2011, more than 27 countries have hosted IAD events that include family-friendly archaeology fairs, lec-

tures, ancient-technology demonstrations, and more. We estimate that more than 100,000 people have taken part in these activities.

IAD is a collaborative effort and, although the celebration is organized by the AIA, events are hosted by a wide array of institutions and groups around the world. The number of collaborators has also grown dramatically since 2011, when we had 14 Collaborating Organizations. In 2014, more than 400 organizations, including the

Organizations.

The popularity and growth of IAD is a testament to the worldwide interest in archaeology and the achievements of the past. In the coming year, the AIA will continue to work to expand the celebration in an ongoing effort to inform people about cultural heritage and make archaeology accessible to everyone. To read more about the program and find out how you can join in next year's IAD, please visit www.archaeologyday.org.

Archaeology for \$1,000, Alex!

IN 2014, INTERNATIONAL Archaeology Day made its television debut on the popular game show *Jeopardy!* After discussions early in 2014 between the show's producer and AIA staff, archaeology debuted as a category in the episode that aired on October 17, 2014—the day before IAD. It was introduced in the “Double Jeopardy” round by the show's host, Alex Trebek, who explained that it was being includ-



ed in honor of IAD. *Jeopardy!* is one of the highest-rated game show series in syndication and averages 25 million

viewers each week. Since its debut in 1984, *Jeopardy!* has received numerous awards, including multiple Emmys and a Peabody in 2012 for its role in “encouraging, celebrating, and rewarding knowledge.” The U.S. Patent and Trademark Office granted the program trademark status as “America’s Favorite Quiz Show.” It was both an honor and a thrill to have International Archaeology Day mentioned on air.

National Organizations Join International Archaeology Day as Sponsors

IN 2014, THE AIA welcomed the National Park Service and the National Oceanic and Atmospheric Administration's National Marine Sanctuaries program as IAD sponsors. Both organizations are natural partners for the AIA. The National Park Service is involved with the survey, excavation,



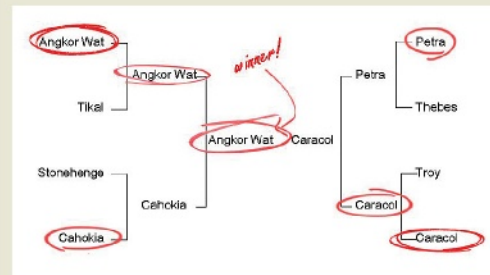
curation, preservation, and educational presentation of more than 68,000 archaeological sites within its parks, while the National Marine Sanctuaries program protects, studies, and promotes underwater cultural heritage including prehistoric sites, shipwrecks, and naval battlefields in America's oceans and Great Lakes. With the support of these important national organizations, IAD activities that inform the public about archaeological discoveries and the importance of preserving and protecting cultural heritage will be accessible to even more people. We look forward to long partnerships with both organizations.



Angkor Wat Overcomes Stiff Competition in ArchaeoMadness

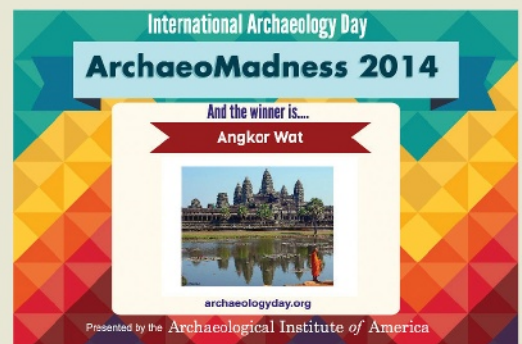
AFTER SEVERAL WEEKS of intense competition, Angkor Wat in Cambodia emerged as the first ever “ArchaeoMadness” champion. ArchaeoMadness, a bracket-style competition modeled on college basketball's March Madness, was introduced in 2014 as a way for people from around the world to participate online in the fun and excitement of IAD.

Thirty-two archaeological sites were selected to compete in ArchaeoMadness. Sites were matched up in pairs in a head-to-head elimination contest and participants were encouraged to vote for their favorite of the two. The winning site from each matchup moved on to the next round.

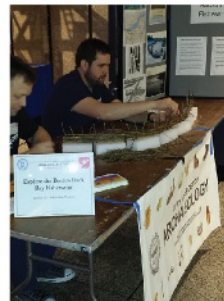


most formidable opponent and the competition's runner-up was the site of Caracol. In the first round, Caracol soundly defeated Pompeii, a major upset considering Pompeii was the most popular pick to win the competition. Caracol then went on to beat Sterkfontein, Troy, and Petra before finally falling to Angkor Wat.

Tweet your nominations for next year's competition to @ArchaeologyDay and be sure to use the #ArchaeoMadness hashtag. The tournament will feature four sites from each of the following geographic regions: Africa, Central America, Central and Eastern Asia, Europe, the Near East, North America, South America, and Oceania.



Ultimately, Angkor Wat, the Khmer capital from the ninth to fifteenth centuries, and an artistic and architectural icon, beat out several other well-known sites including Chaco Canyon, Machu Picchu, Tikal, and Cahokia before being crowned the champion. Angkor Wat's



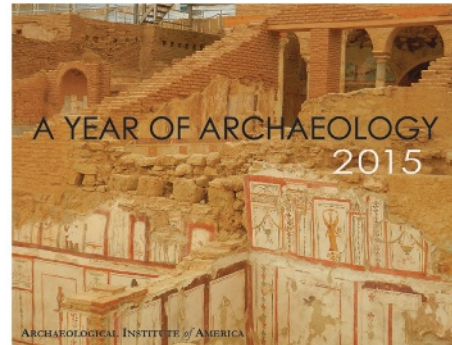
AIA-MOS Fair in Its Eighth Year

ON OCTOBER 17 AND 18, 2014, the AIA joined the Museum of Science (MOS) in Boston to host the eighth annual AIA-MOS Archaeology Fair. This two-day event brings together institutions and organizations from around New England to share the wonder of archaeological discovery with the public. The event regularly draws close to 6,000 people, including more than 2,000 students on field trips.

This year, the AIA and MOS were joined by 17 other organizations. Presentations and activities at the event covered ancient technologies, mock excavations, artifact reconstruction, and more. Attendees learned how to map a historic shipwreck and build a fish weir. An activity on Maya math demonstrated the versatility and elegance of the bar-and-dot numeric system used by ancient Mesoamericans. Visitors also had the opportunity to see live demonstrations of flint knapping and glassblowing and could even try on a Roman soldier's battle gear.

"A Year of Archaeology": The AIA 2015 Calendar Is Now Available

THE 2015 AIA CALENDAR, "A Year of Archaeology," featuring photos from the AIA online photo contest, is available for purchase at www.archaeological.org/calendar. All proceeds from the sale of the calendar go directly to the AIA Site Preservation Program and will be used to protect and preserve archaeological sites around the world. Buy this special calendar and enjoy the beauty of archaeology all year long while you help the AIA preserve archaeological sites for future generations to study and enjoy.

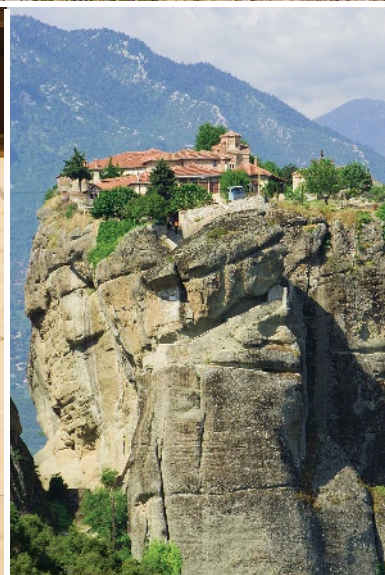


Crowdfunding Supports Society Outreach Programs

IN 2014, THE AIA organized its first crowdfunding campaign. Through the website Indiegogo, the AIA raised nearly \$6,000 for its Society Outreach Grant Program. The program provides small grants to AIA Local Societies to support community activities designed to raise interest in archaeology and to familiarize people with the AIA and its activities. Events supported range from lectures to large archaeology fairs. Below are the programs that received grants in 2014:

- ♦ Silencing Homer: The *Iliad* and the *Odyssey* in Early Cinema—AIA Charleston Society in conjunction with the Archaeology and Classics Clubs at the College of Charleston
- ♦ International Archaeology Day Fair in Virginia—AIA Charlottesville Society with the University of Virginia's McIntire Department of Art, Department of Anthropology, Interdisciplinary Archaeology Program, Fralin Museum of Art, and Institute for Advanced Technology in the Humanities
- ♦ Students in Archaeology: Poster Presentation of Recent Fieldwork and Research Projects Related to Preservation and Repatriation—AIA Minnesota Local Society in collaboration with Macalester College
- ♦ Cincinnati Archaeology Fair—AIA Cincinnati Society with presenters from Northern Kentucky University, the University of Cincinnati Anthropology and Classics Departments, and the Cincinnati Museum Center
- ♦ As the Wheel Turns: Potters and Society in Ancient Greece—AIA Tucson Society
- ♦ Can You Dig It?—AIA East Tennessee Society and the McClung Museum of Natural History and Culture
- ♦ AIA-Atlantic Classical Association Joint Lecture—AIA New Brunswick Society
- ♦ Orange County Society Membership-Building Initiative—AIA Orange County Society

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ARTIFACT

Beginning in about 1700 B.C., a new material became available in northern Europe that would change the way entire classes of objects were made and how wealth and status were expressed. In Denmark, bronze, which was imported through extensive trade networks with southern Europe, became the material of choice for tools, weapons, ceremonial objects, and jewelry for more than a thousand years. But for the early years of the Bronze Age, when these networks were still developing, the toolmakers of Denmark were faced with a problem—not enough bronze. Though scholars have long been aware of the shortage of raw materials, it wasn't until fall 2014 that archaeologists from the Museum Lolland-Falster in southern Zealand discovered a unique artifact—a Bronze Age hafted dagger that wasn't made of bronze. In fact, it was fashioned from flint. “We know this type of dagger existed,” says museum archaeologist Anders Rosendahl, “but to find an example is simply fantastic.” Although ordinarily an indispensable and valuable object such as a dagger would have been taken by its owner to his grave, the Rødbyhavn knife was found on an ancient seabed.

The dagger is modeled after its bronze counterparts and demonstrates the skill that tool and weapon makers had developed during the preceding Neolithic period. The find is even more exciting, explains Rosendahl, because, in addition to the stone blade, the dagger's shaft and even the birch bark wrapped around the handle to give the user a better grip were preserved after several thousand years.

WHAT IS IT
<i>Dagger</i>
CULTURE
<i>Bronze Age</i>
DATE
<i>1700–500 B.C.</i>
MATERIALS
<i>Flint and bark</i>
FOUND
<i>Rødbyhavn, Denmark</i>
DIMENSIONS
<i>7.8 inches long</i>



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Tunisia (17 days)

Explore the great Phoenician, Roman and Islamic monuments of Tunisia with Prof. Pedar W. Foss, DePauw U. Beginning with five days in Tunis, we visit Carthage, the Bardo Museum's fabulous mosaic collection, Thuburbo Majus and Punic Kerkouane. Tour highlights include the Roman Dougga, Sbeitla and El Jem, the underground Numidian capital at Bulla Regia and Kairouan. Traveling south we visit underground cities, fortified granaries, Berber troglodyte villages and exotic bazaars.



South Korea (15 days)

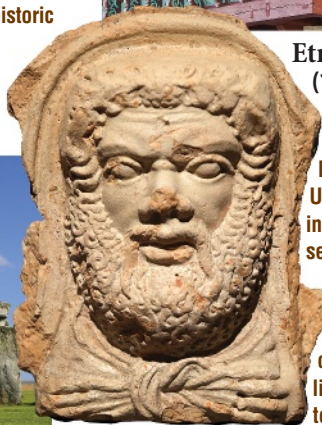
Discover Korea's 5,000 years of history with Prof. Donald Baker, U. of British Columbia. We begin in Seoul, capital of the Joseon dynasty and continue to Gongju to visit the royal tombs of the Baekje dynasty and to Gyeongju, capital of the Silla dynasty. Highlights include the Seokguram Buddhist Grotto, Buseok-sa Temple, the Tripitaka Koreana of Haein-sa Temple, the Demilitarized Zone and the ancient tumuli and rock sculptures around Gwangju. We will also experience the music, dance and folklore of traditional Korea.



Etruscan Italy (15 days)

Visit Etruscan Italy with Prof. Larissa Bonfante, New York U. Tour highlights include the hill sites selected for their cities, their tombs, and in museums, the beautiful objects used in their lifetimes and taken to their graves. We

will visit the great Etruscan collections in Rome and Florence and explore the medieval hill towns of Perugia, Cortona and Orvieto.



Central Mexico (14 days)

Journey through the heart of the Aztec empire with Prof. William Saturno, Boston U. Beginning in Mexico City, highlights include the recently excavated Templo Mayor, the magnificent ceremonial centers of Teotihuacán, Tula and El Tajín, Xalapa's museum and the exciting sites around colonial Puebla. Our journey ends with three days in Oaxaca, exploring the historical sites and craft villages in this colorful region.

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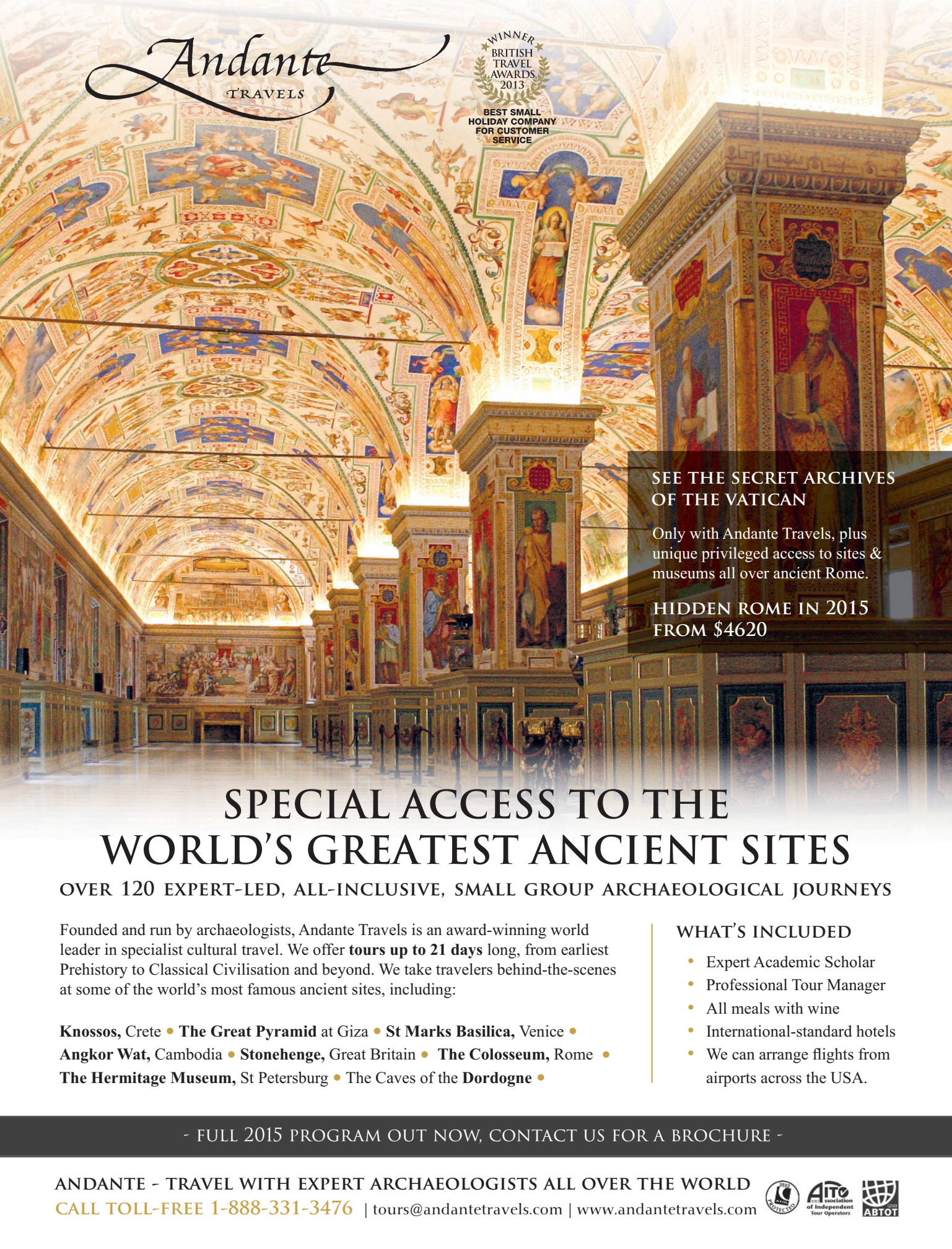
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